TS300-E5

Intel® Xeon 3000/3200 Series LGA775 Pedestal/5U Server

E3690

Second Edition V2
April 2008

Contents

Contents

Contents

Contents

Contents

Notices

Federal Communications Commission Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with manufacturer's instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

WARNING! The use of shielded cables for connection of the monitor to the graphics card is required to assure compliance with FCC regulations. Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

Canadian Department of Communications Statement

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

This class B digital apparatus complies with Canadian ICES-003.

This symbol of the crossed out wheeled bin indicates that the product (electrical, electronic equipment and mercury-containing button cell battery) should not be placed in municipal waste. Check local regulations for disposal of electronic products.

Safety information

Electrical Safety

- Before installing or removing signal cables, ensure that the power cables for the system unit and all attached devices are unplugged.
- To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.
- When adding or removing any additional devices to or from the system, ensure that the power cables for the devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.
- If the power supply is broken, do not try to fix it by yourself. Contact a qualified service technician or your dealer.

Operation Safety

- Any mechanical operation on this server must be conducted by certified or experienced engineers.
- Before operating the server, carefully read all the manuals included with the server package.
- Before using the server, make sure all cables are correctly connected and the power cables are not damaged. If any damage is detected, contact your dealer as soon as possible.
- To avoid short circuits, keep paper clips, screws, and staples away from connectors, slots, sockets and circuitry.
- Avoid dust, humidity, and temperature extremes. Place the server on a stable surface.

This product is equipped with a three-wire power cable and plug for the user's safety. Use the power cable with a properly grounded electrical outlet to avoid electrical shock.

Lithium-Ion Battery Warning

CAUTION! Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

CD-ROM Drive Safety Warning

CLASS 1 LASER PRODUCT

Heavy System

CAUTION! This server system is heavy. Ask for assistance when moving or carrying the system.

About this guide

Audience

This user guide is intended for system integrators and experienced users with at least basic knowledge of configuring a server.

Contents

This guide contains the following parts:

1. **Chapter 1: Product Introduction**

   This chapter describes the general features of the server, including sections on front panel and rear panel specifications.

2. **Chapter 2: Hardware setup**

   This chapter lists the hardware setup procedures that you have to perform when installing or removing system components.

3. **Chapter 3: Installation options**

   This chapter describes how to install optional components into the barebone server.

4. **Chapter 4: Motherboard information**

   This chapter gives information about the motherboard that comes with the server. This chapter includes the motherboard layout, jumper settings, and connector locations.

5. **Chapter 5: BIOS information**

   This chapter tells how to change system settings through the BIOS Setup menus and describes the BIOS parameters.

6. **Chapter 6: RAID configuration**

   This chapter provides information on how toconfigure your hard disk drives as RAID sets.

7. **Chapter 7: Driver installation**

   This chapter provides information on how to create a RAID set and how to install the drivers for system components. This chapter also describes the software applications that the barebone server supports.

8. **Appendix: Reference information**

   This section provides information about the power supply unit and a troubleshooting guide for solving common problems when using the barebone server.

Conventions

To make sure that you perform certain tasks properly, take note of the following symbols used throughout this manual.

WARNING: Information to prevent injury to yourself when trying to complete a task.

CAUTION: Information to prevent damage to the components when trying to complete a task.

IMPORTANT: Instructions that you MUST follow to complete a task.

NOTE: Tips and information to aid in completing a task.

Reference

Visit the ASUS websites worldwide that provide updated information for all ASUS hardware and software products. Refer to the ASUS contact information for details.

Chapter 1

This chapter describes the general features of the barebone server, including sections on the front panel and rear panel specifications.

Product introduction

1.1 System package contents

Check your system package for the following items.

Model Name	TS300-E5/PA4	TS300-E5/PX4
Chassis	ASUS T30 Pedestal 5U Rackmount Chassis	ASUS T30 Pedestal 5U Rackmount Chassis
Motherboard	ASUS P5BP-E/4L Server Board	ASUS P5BP-E/4L Server Board
Component	450W Single Power Supply SATA/SAS Backplane Board Floppy Disk Drive 12cm System fan 4 x Hot-swap HDD trays (including HDD screws) 4 x Chassis Roller Wheels Front I/O Board	450W Single Power Supply SATA/SAS Backplane Board Floppy Disk Drive 12cm System fan 4 x Hot-swap HDD trays (including HDD screws) 4 x Chassis Roller Wheels Front I/O Board ASUS SASsaby 1064E SAS RAID controller card
Accessories	CPU Heatsink System Bazel Keys (2pcs) ASUS TS300-E5 User's Guide ASUS ASWM 2.0 User's Guide TS300-E5 Support CD (including ASWM*) Bag of Screws 1 x IDE Cable (or pre-installed) 1 x AC Power Cord	CPU Heatsink System Bazel Keys (2pcs) ASUS TS300-E5 User's Guide ASUS ASWM 2.0 User's Guide TS300-E5 Support CD (including ASWM*) Bag of Screws 1 x IDE Cable (or pre-installed) 1 x AC Power Cord
Optional Items	ASUS TS300-E5 Rackmount Rail Kit 5.25" DVD-ROM or DVD-RW Drive CA eTrust Anti-virus Software CD 9 cm HDD Blower	ASUS TS300-E5 Rackmount Rail Kit 5.25" DVD-ROM or DVD-RW Drive CA eTrust Anti-virus Software CD 9 cm HDD Blower

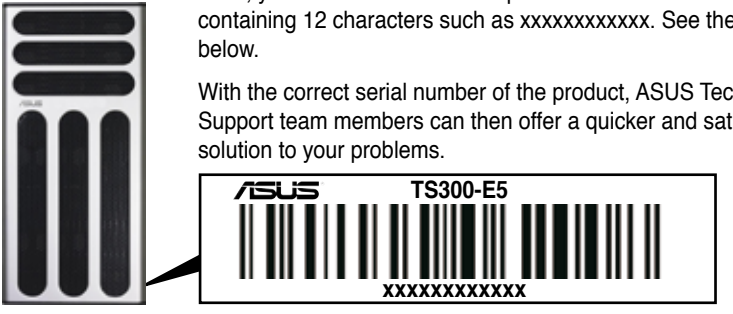
***ASUS System Web-based Management**

If any of the above items is damaged or missing, contact your retailer.

1.2 Serial number label

Before requesting support from the ASUS Technical Support team, you must take note of the product's serial number containing 12 characters such as xxxxxxxxxxxx. See the figure below.

With the correct serial number of the product, ASUS Technical Support team members can then offer a quicker and satisfying solution to your problems.



1.3 System specifications

The ASUS TS300-E5 is a 5U barebone server system featuring the ASUS P5BP-E/4L server board. The server supports Intel® LGA775 Xeon 3000 / 3200 processors with EM64T technology, plus other latest technologies through the chipsets onboard.

Model Name		TS300-E5/PA4 TS300-E5/PX4
Processor / System Bus		1 x Socket LGA775
		Dual-Core Intel® Xeon® processor 3000 / Wolfdale sequence Quad-Core Intel® Xeon® processor 3200 (G-0) / Yorkfield sequence Supports Intel® Enhanced Memory 64 Technology (EM64T) Supports Enhanced Intel SpeedStep® Technology (EIST) Supports Intel® Hyper-Threading Technology
System Bus		FSB 800 / 1066 / 1333
Core Logic		Intel® Bigby-P (MCH) Intel® ICH7R
ASUS Features	Smart Fan	Smart Fan I
	ASWM2.0	√
Memory	Total Slots	4 (Dual-Channel)
	Capacity	Maximum up to 8GB
	Memory Type	DDR2 667/800 Unbuffered, ECC
	Memory Size	512 MB, 1 GB & 2GB
Expansion Slots	Total PCI/PCI-X/PCI-E Slots	6
	Slot Type	2 x PCI-E x16 slots** (x 8 link) 1 x PCI-E x8 slot (x1 link) 3 x PCI 32-bit/33MHz slots (5V)
	Additional Slot	1 x SO-DIMM socket for upcoming optional ASUS ASMB3-iKVM controller card
Storage	SATA Controller (For PA4 model)	**Intel® ICH7R:** - 4 SATA2 300MB/s ports - Intel® Matrix Storage supporting software RAID 0, 1, 10 & 5 (for Windows only)*** **LSI MegaRAID:** - Supports software RAID 0, 1& 10 (for Linux / Windows)***
	SAS Controller (For PX4 model)	ASUS SASsaby 1064E SAS RAID controller card supporting RAID 0, 1 and 1E

(continued on the next page)

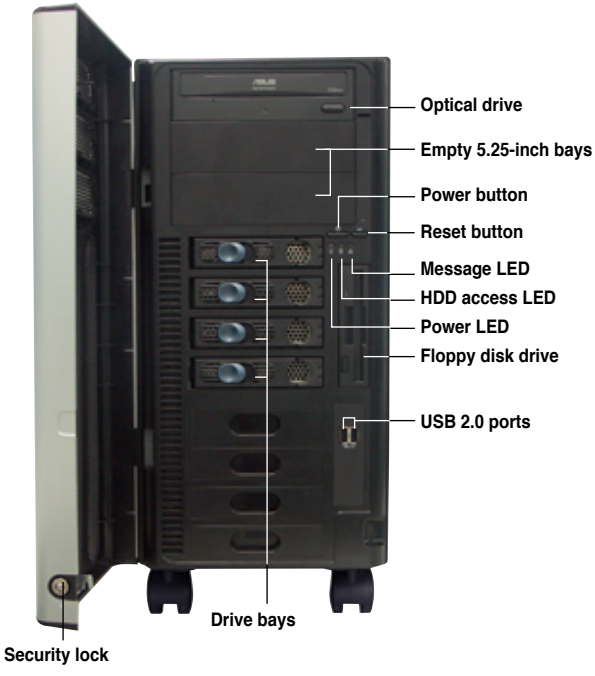
HDD Bays	**I = internal A or S will be hot-swappable**	4 x Hot-swap SATA2 HDD Bays	4 x Hot-swap SAS HDD Bays
Networking	**LAN**	4 x Broadcom® BCM5721 PCI-E GbE LAN	
Graphic	**VGA**	XGI Z9S VGA Controller / 32MB DDRII SDRAM	
Auxiliary Storage FDD / CD / DVD		1 x FDD 3 x 5.25" media bays (Options: No ODD/DVD-ROM/DVD-RW)	
Onboard I/O		1 x External Serial Port 5 x RJ-45 ports (4 for GbE LANs and 1 for upcoming ASUS ASMB3-iKVM controller card) 4 x USB 2.0 ports (Front x 2, Rear x 2) 1 x VGA port 1 x PS/2 keyboard port 1 x PS/2 mouse port	
Anti-virus Software		Optional CA® eTrust™ 7.1 anti-virus software	
Management Solution	**Software**	ASUS Server Web-based Management (ASWM) 2.0	
	Out of Band Remote Management	(Optional) ASUS ASMB3-SOL or upcoming ASMB3-iKVM controller card	
Dimension (HH x WW x DD)		431mm x 220mm x 510mm	
Net Weight Kg (CPU, DRAM & HDD not inclu ded)		18Kg	
Power Supply		450W Single Power Supply	
Environment		Operation temperature: 10°C ~ 35°C / Non operation temperature: -40°C ~ 70°C Non operation humidity: 20% ~ 90% (Non condensing)	

*** Specifications are subject to change without notice.**
**** One PCI-E x16 slot is pre-installed with the ASUS SASsaby SAS RAID controller card in PX4 model.**
***** Refer to www.asus.com for supported operating systems.**

1.4 Front panel features

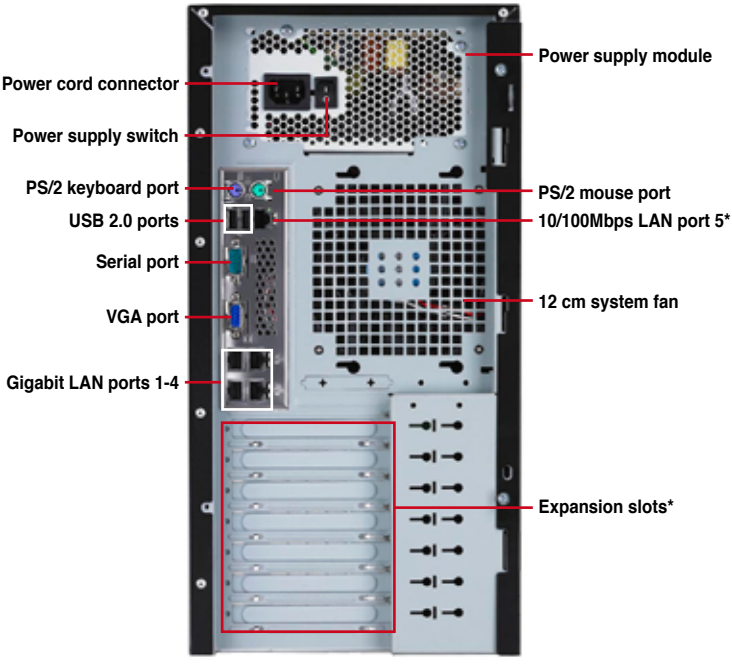
The TS300-E5 chassis displays a stylish front bezel with lock. The bezel covers the system components on the front panel and serves as security. Open the bezel to access the front panel components.

The drive bays, power and reset buttons, LED indicators, optical drive, floppy drive, and USB 2.0 ports are located on the front panel. For future installation of 5.25-inch devices, two drive bays are available.



1.5 Rear panel features

The rear panel includes a slot for the motherboard rear I/O ports, expansion slots, a chassis lock and intrusion switch, a vent for the system fan, and power supply module.

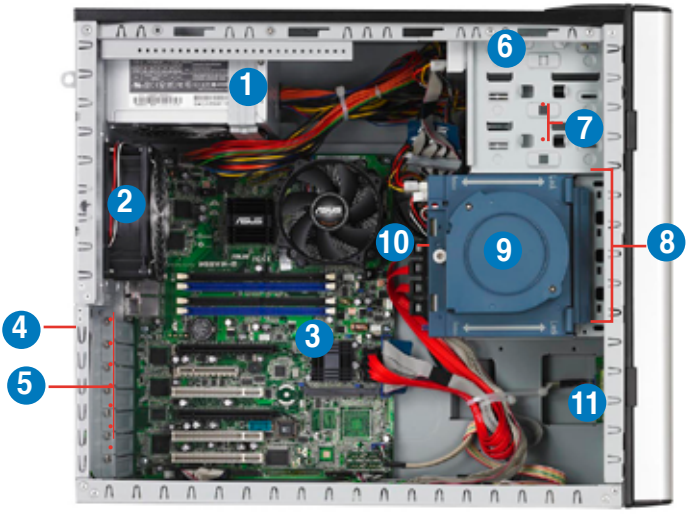


- LAN 5 is a 10/100Mbps LAN (RJ-45) port for upcoming ASUS ASMB3-iKVM controller card only and does not support common network connections.
- The PX4 model comes with a ASUS SASsaby 1064E SAS RAID controller card by default.

1.6 Internal features

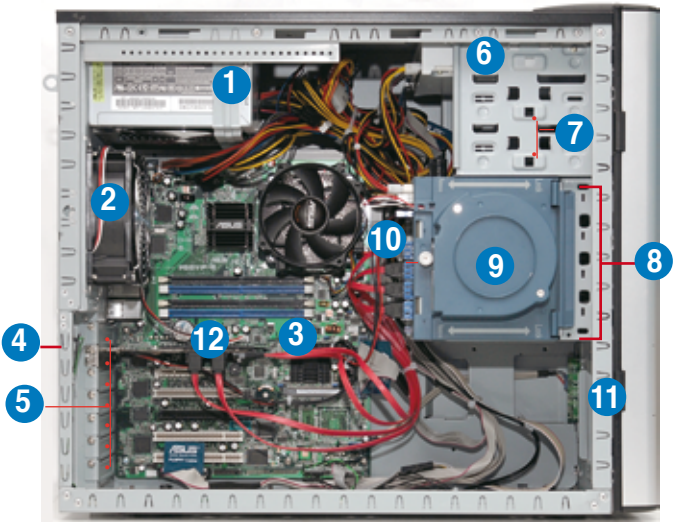
The barebone server includes the basic components as shown.

PA4 (Four Hot-swap SATA2 HDD Devices)



1. Power supply unit
2. 12cm system fan
3. ASUS P5BP-E/4L Server Board
4. Chassis intrusion switch
5. Expansion card locks
6. Optical drive
7. 2 x 5.25-inch drive bays
8. Hot-swap HDD bays
9. 9cm HDD Blower (optional)
10. SATA/SAS backplane board (hidden)
11. Front I/O panel

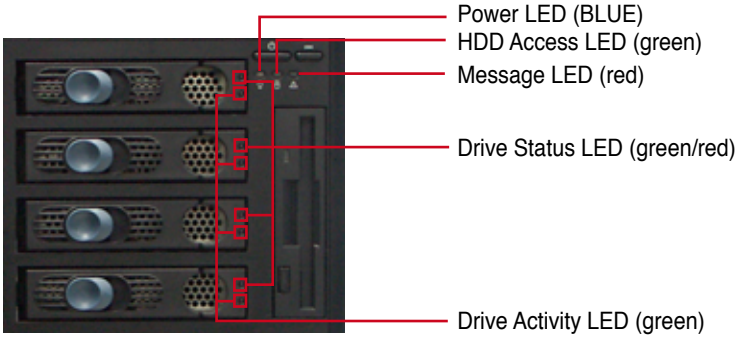
PX4 (Four Hot-swap SAS HDD Devices)



1. Power supply unit
2. 12cm system fan
3. ASUS P5BP-E/4L Server Board
4. Chassis intrusion switch
5. Expansion card locks
6. Optical drive
7. 2 x 5.25-inch drive bays
8. Hot-swap HDD bays
9. 9cm HDD Blower (optional)
10. SATA/SAS backplane board (hidden)
11. Front I/O panel
12. SAS controller card

1.7 LED information

1.7.1 Front panel LEDs



LED	Icon	Display status	Description
Power LED		ON	System power ON
HDD Access LED		OFF Blinking	No activity Read/write data into the HDD
Message LED		OFF Blinking	System is normal; no incoming event ASWM indicates a HW monitor event
Drive status LED		Green Red Green/Red blinking	Bridge board connected to backplane Installed HDD is in good condition HDD failure HDD rebuilding using the RAID card
Drive activity LED		Blinking	Read/write data into the HDD

The Power, HDD Access, and Message LEDs are visible even if the system front bezel is closed.

1.7.2 Rear panel LEDs

ACT/LINK LED		SPEED LED	
Status	Description	Status	Description
OFF	No link	OFF	10 Mbps connection
GREEN	Linked	ORANGE	100 Mbps connection
BLINKING	Data activity	GREEN	1 Gbps connection

Chapter 2

Hardware setup

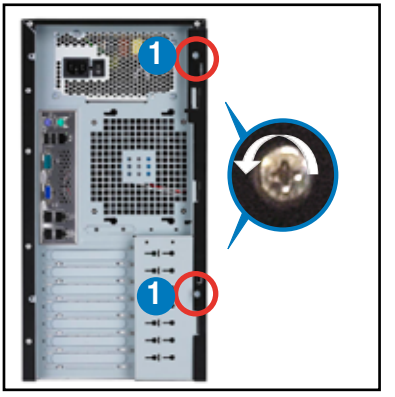
This chapter lists the hardware setup procedures that you have to perform when installing or removing system components.

2.1 Chassis cover

The chassis features a “screwless design” that allows convenient assembly and disassembly. You can simply push or slide mechanical bolts and locks to remove the cover.

2.1.1 Removing the side cover

1. Remove the two screws that secure the cover to the chassis.



2. Slide the side cover for about half an inch toward the rear until it is disengaged from the chassis.
3. Carefully lift the cover and set it aside.

Viewing the internal structure

Without the side cover, the internal structure and installed components of the barebone server vary depending on the model you purchased. Refer to section **1.5 Internal features** for the different model configurations.

Perform the procedures in the succeeding sections to install the CPU, system memory, disk drives, and expansion cards; replace fans and power supply; and connect the system cables.

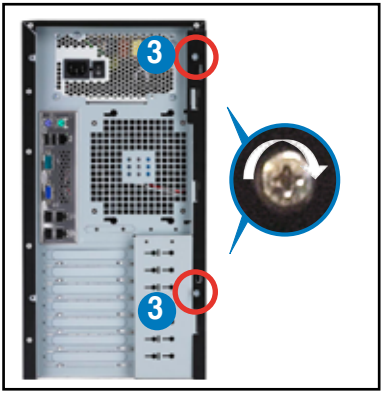
You may need to remove some of the installed components to access the DIMM sockets and internal connectors. Refer to section **2.10 Removable components** for instructions.

2.1.2 Reinstalling the side cover

To reinstall the side cover:

1. Match and insert the upper hooks and lower sliding edge of the cover to the corresponding chassis holes and edge.
2. Slide the cover toward the front until it snaps in place.

3. Drive in the two screws you removed earlier to secure the side cover.

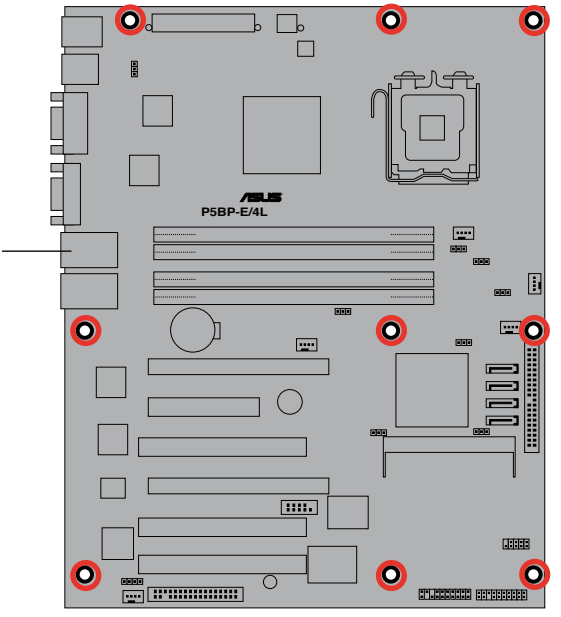


2.2 Motherboard overview

The barebone server comes with the P5BP-E/4L motherboard already installed. The motherboard is secured to the chassis by nine (9) screws as indicated by the circles in the illustration below.

Refer to **Chapter 4: Motherboard information** for detailed information on the motherboard.

Place this side towards the rear of the chassis



Make sure to unplug the power cord before installing or removing any motherboard component or connection. Failure to do so can cause you physical injury and damage motherboard components.

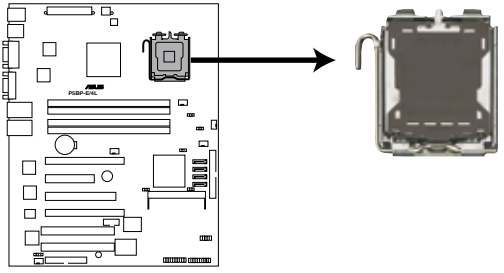
2.3 Central Processing Unit (CPU)

The motherboard comes with a surface mount LGA775 socket designed for the Intel® Xeon 3000 / 3200 Series processor in the 775-land package

2.3.1 Installing the CPU

To install a CPU:

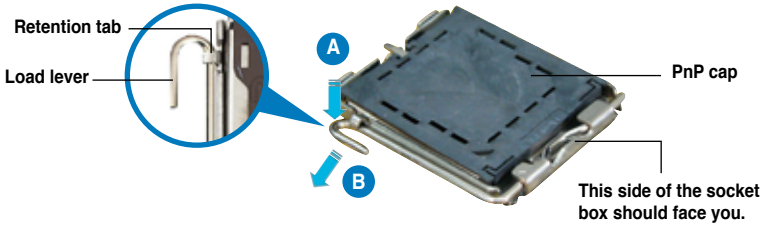
1. Locate the CPU socket on the motherboard.



P5BP-E/4L CPU Socket 775

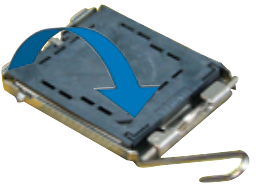
Before installing the CPU, make sure that the socket box is facing towards you and the load lever is on your left.

2. Press the load lever with your thumb (A), then move it to the left (B) until it is released from the retention tab.

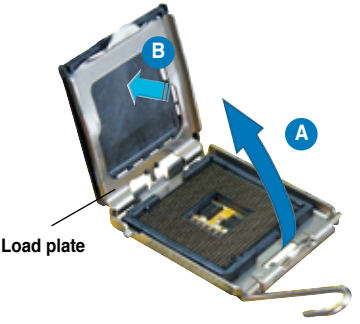


To prevent damage to the socket pins, do not remove the PnP cap unless you are installing a CPU.

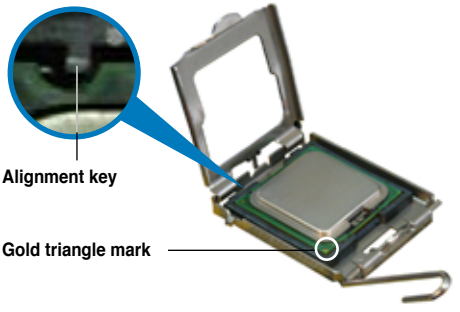
3. Lift the load lever in the direction of the arrow to a 135º angle.



4. Lift the load plate with your thumb and forefinger to a 100º angle (A), then push the PnP cap from the load plate window to remove (B).

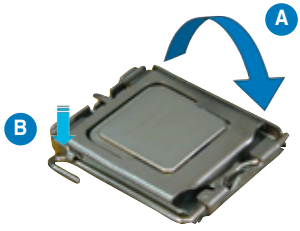


5. Position the CPU over the socket, making sure that the gold triangle is on the bottom-left corner of the socket. The socket alignment key should fit into the CPU notch.



The CPU fits in only one correct orientation. DO NOT force the CPU into the socket to prevent bending the connectors on the socket and damaging the CPU!

6. Close the load plate (A), then push the load lever (B) until it snaps into the retention tab.



The motherboard supports Intel® Xeon 3000 / 3200 Series LGA775 processors with the Intel® Enhanced Memory 64 Technology (EM64T), Enhanced Intel SpeedStep® Technology (EIST), and Hyper-Threading Technology. Refer to the Appendix for more information on these CPU features.

2.3.2 Central Processing Unit (CPU)

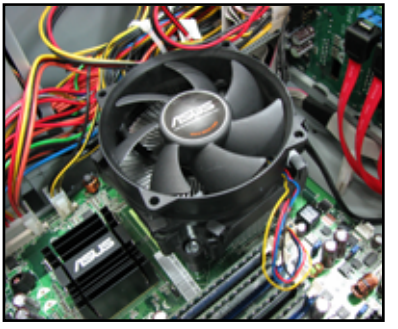
The Intel® Xeon™ processors require an Intel certified or ASUS qualified heatsink and fan assembly to ensure optimum thermal condition and performance.

When you buy a boxed Intel CPU, the package includes the cooler, fan, retention brackets, screws, thermal grease, installation manual, and other items that are necessary for CPU installation.

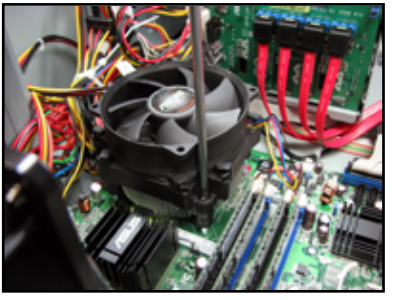
- Make sure that you have applied the thermal grease to the top of the CPU before installing the heatsink and fan.
- Refer to the installation manual that came with the CPU package for details on heatsink/fan assmbly and installation.

To install the CPU cooler and fan:

1. Place the cooler on top of the installed CPU, making sure that the four screws match the holes on the support plate.

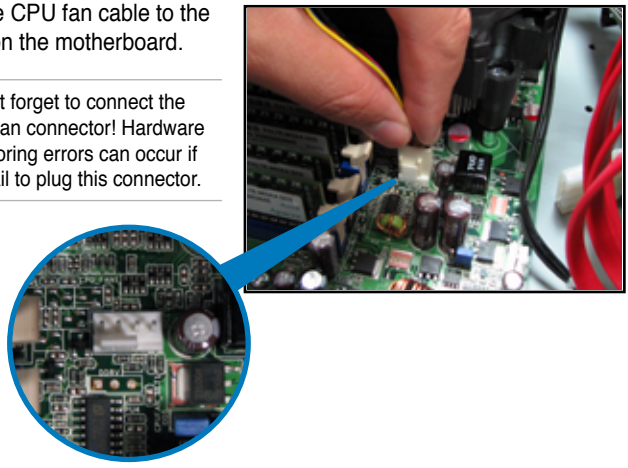


2. Use a screwdriver to tighten the four cooler screws in a diagonal sequence.



3. Connect the CPU fan cable to the connector on the motherboard.

Do not forget to connect the CPU fan connector! Hardware monitoring errors can occur if you fail to plug this connector.

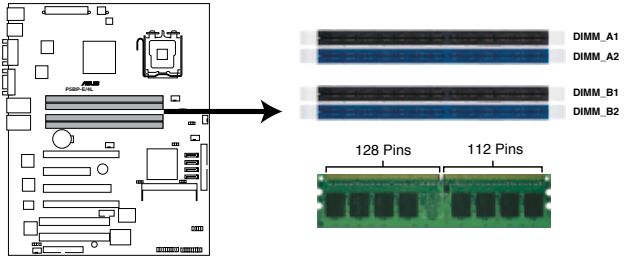


2.4 System memory

2.4.1 Overview

The motherboard comes with four Double Data Rate II (DDR2) Dual Inline Memory Modules (DIMM) sockets to support 240-pin DDR2 modules.

The figure illustrates the location of the DDR2 DIMM sockets:



P5BP-E/4L 240-pin DDR2 DIMM Sockets

2.4.2 Memory configurations

You may install 256 MB, 512 MB, 1 GB, and 2 GB unbuffered ECC or non-ECC DDR2-667/800 DIMMs into the DIMM sockets.

- Always install DIMMs with the same CAS latency. For optimum compatibility, it is recommended that you obtain memory modules from the same vendor. Refer to the DDR2 Qualified Vendors List at the ASUS web site.
- When installing one or two DIMMs, install the DIMM(s) to the blue slots (DIMM_A2/DIMM_B2).
- Three DDR DIMMs intalled into any three memory sockets will function in dual-channel asmmetric mode.

Recommended memory configurations

Mode	Single channel mode		Dual channel interleaved mode		Dual channel asymmetic mode	
Number of memories	1	1	2	4*	3	4*
DIMM socket						
DIMM_A1				V	V	V
DIMM_A2		V	V	V	V	V
DIMM_B1				V		V
DIMM_B2	V		V	V	V	V

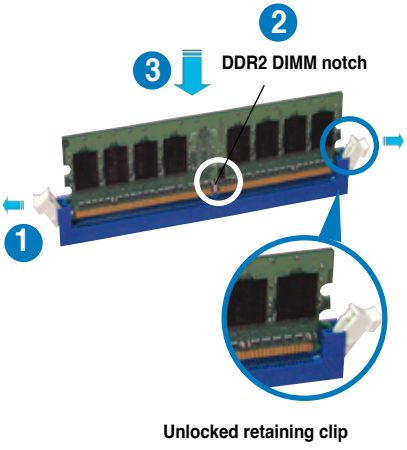
- When the total size of memory module(s) installed per channel is the same (A1+A2=B1+B2), the system will run in Dual Channel Interleaved mode which provides optimum performance.
- When the total size of each channel is not the same (A1+A2≠B1+B2), the system will run in Dual Channel Asymmetric mode.

2.4.3 Installing a DIMM

Unplug the power supply before adding or removing DIMMs or other system components. Failure to do so can cause severe damage to both the motherboard and the components.

To install a DIMM:

1. Unlock a DIMM socket by pressing the retaining clips outward.
2. Align a DIMM on the socket such that the notch on the DIMM matches the break on the socket.
3. Firmly insert the DIMM into the socket until the retaining clips snap back in place and the DIMM is properly seated.



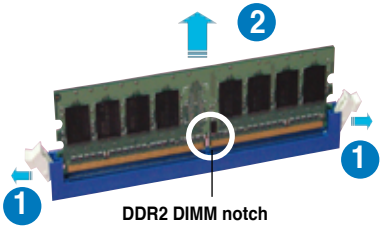
- A DDR2 DIMM is keyed with a notch so that it fits in only one direction. Do not force a DIMM into a socket to avoid damaging the DIMM.
- The DDR2 DIMM sockets do not support DDR DIMMs. DO not install DDR DIMMs to the DDR2 DIMM sockets.

2.4.4 Removing a DIMM

To remove a DIMM:

1. Simultaneously press the retaining clips outward to unlock the DIMM.

Support the DIMM lightly with your fingers when pressing the retaining clips. The DIMM might get damaged when it flips out with extra force.



2. Remove the DIMM from the socket.

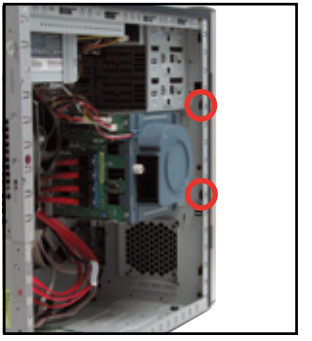
2.5 Front panel assembly

2.5.1 Removing the front panel assembly

Before you can install a 5.25-inch drive, you should first remove the front panel assembly (front bezel and front panel cover). The front panel assembly is attached to the chassis through three hooked tabs on the left side and four hinge-like tabs on the right side.

To remove the front panel assembly:

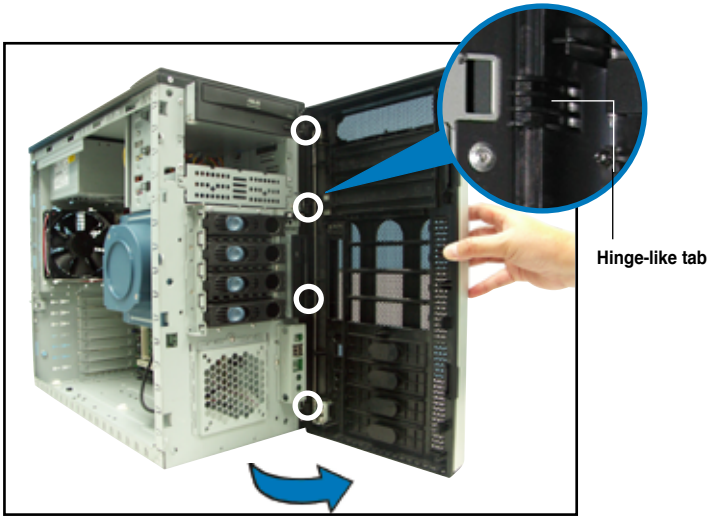
1. Locate the two hooked tabs on the chassis side rail.
2. Press each lock tab to release the front panel from the chassis.



3. Pull and swing the left edge of the front panel outward.

4. Unhook the hinge-like tabs from the holes on the right side of the front panel to completely detach the front panel assembly from the chassis.

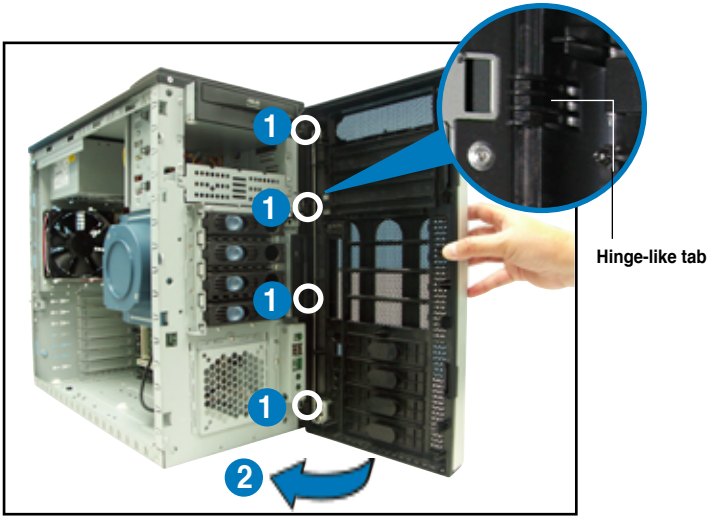
Do not use too much force when removing the front panel assembly.



2.5.2 Reinstalling the front panel assembly

To reinstall the front panel assembly (front bezel and front panel cover):

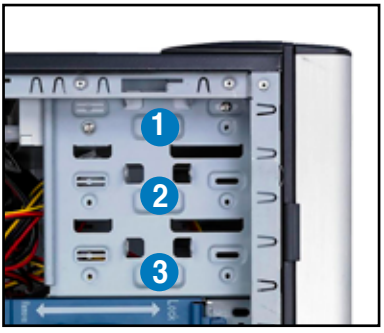
1. Insert the four hinge-like tabs to the holes on the right edge of the chassis.
2. Swing the front panel to the left and fit the four (4) hooked tabs to the left side of the chassis until the tabs snap back in place.



2.6 5.25-inch drives

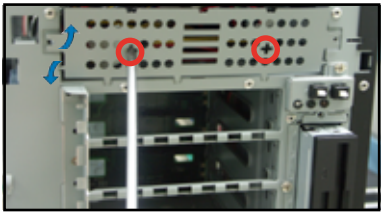
If you have previously used and powered up the system, and that it may be connected to an AC power source, make sure to unplug the power cable before installing or removing any system components. Failure to do so may cause damage to the motherboard and other system components!

Three 5.25-inch drive bays are located on the upper front part of the chassis. A CD-ROM drive that comes standard with the system package occupies the uppermost bay (labeled 1). The two lower bays (labeled 2 and 3) are available for additional 5.25-inch devices.

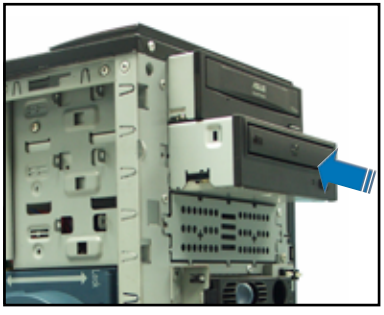


To install a 5.25-inch drive:

1. Use a Phillips (cross) screwdriver to turn outward and inward the metal cover of the bay until it is completely released.

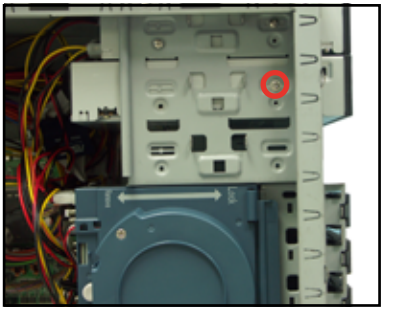


2. Insert the optical drive into the 5.25-inch drive bay.

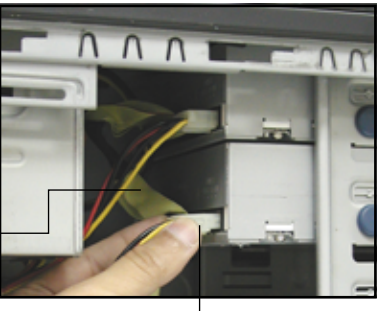


3. Make sure that the drive and bay hole align as shown. When in place, the drive protrudes about an inch from the front panel.

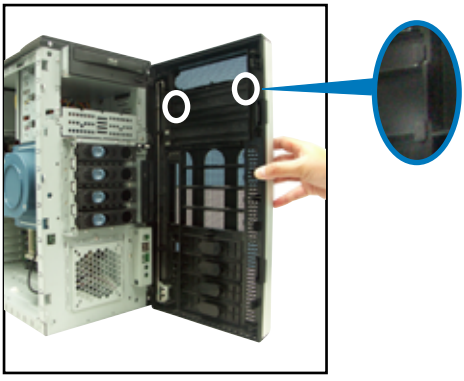
4. Secure the drive with a screw.



5. Connect the IDE cable to the IDE connector on the back of the drive.
6. Connect a 4-pin plug from the power supply to the power connector on the back of the drive.



7. On the front panel assembly, detach the plastic bay cover opposite the 5.25-inch drive that you installed by pressing the two hooked tabs on each side of the bay cover.



8. Reinstall the front panel assembly when done. Refer to section **2.5.2 Reinstalling the front panel assembly** for instructions.

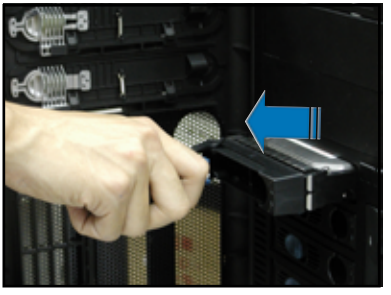
2.7 Hard disk drives

2.7.1 Installing a hot-swap SATA/SAS HDD

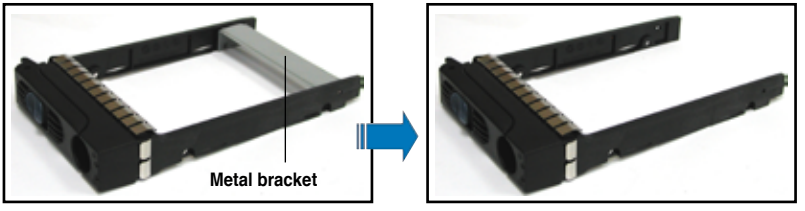
Follow the instructions in this section to install a hot-swap SATA (PA4 model) or SAS (PX4 model) hard disk drive (HDD).

1. Open the front bezel to access the hot-swap drive trays.
2. Release a drive tray by pushing the spring lock to the right, then pulling the tray lever outward. The drive tray ejects slightly after you pull out the lever.

3. Firmly hold the tray lever and pull the drive tray out of the bay.

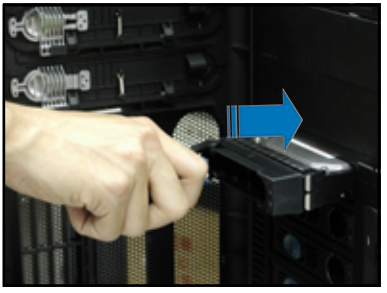


4. An empty drive tray requires a metal bracket for support. Use a Phillips (cross) screwdriver to remove the bracket when you are ready to install a hard disk in the drive tray.

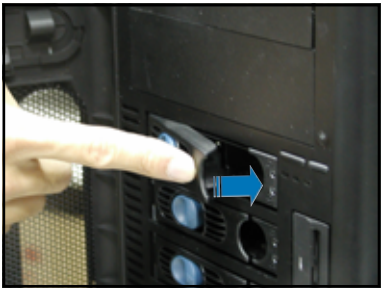


5. Place a SATA or a SAS hard disk to the drive tray, and secure it with four screws.

6. Carefully insert drive tray and push it all the way to the depth of the bay until just a small fraction of the tray edge protrudes.



7. Push the tray lever until it clicks, and secures the drive tray in place. The drive tray is correctly placed when its front edge aligns with the bay edge.

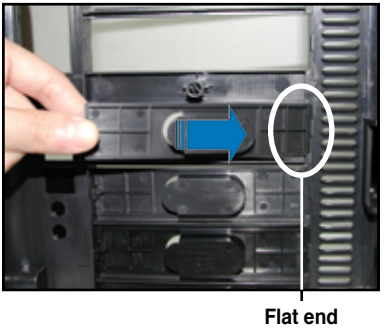


2.7.2 Installing an HDD dummy cover

The HDD dummy covers come pre-installed on the front panel bezel. In case you removed the covers, follow these steps to re-install them.

To install an HDD dummy cover:

1. From the inside of the front panel assembly, insert the flat end of a dummy cover into the slot as shown. The end with the hook tab should be close to the front panel LEDs.



2. Press the dummy cover into the slot opening until the hook tab clicks in place.

3. When installed, the dummy cover appears as shown.

2.8 Expansion cards

Refer to this section when installing expansion cards.

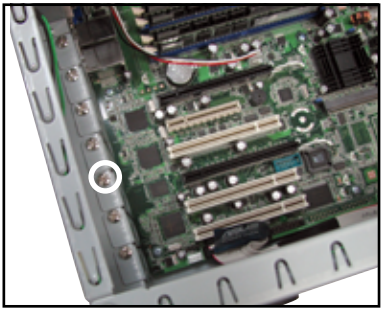
Make sure to unplug the power cord before installing or removing expansion cards. Failure to do so may cause physical injury, and damage to the card and motheboard components!

2.8.1 Installing an expansion card

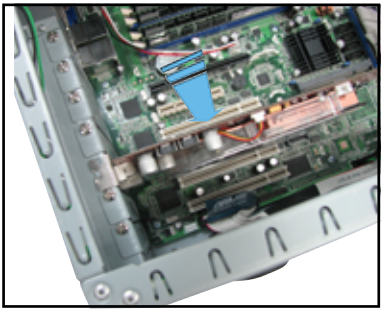
To install an expansion card:

1. Lay the chassis on its side.
2. Locate the metal bracket opposite the slot you want to use.

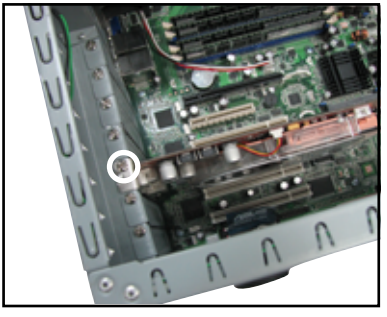
   Remove the screw that secures the metal bracket to the chassis. Set aside the metal bracket for future use.



3. Align the card golden fingers to the slot and its metal bracket to the slot opening on the chassis.
4. Press the card firmly until it is properly seated on the slot.



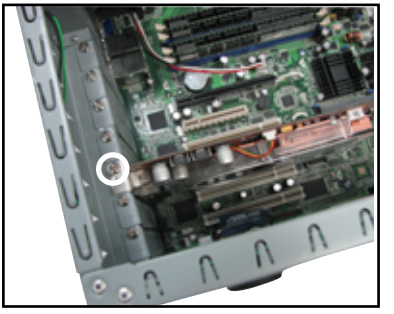
5. Secure the card to the chassis with the bracket screw you removed earlier.



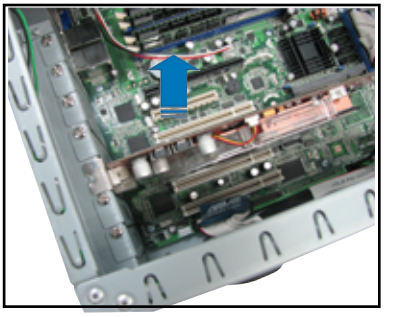
2.8.2 Removing an expansion card

To remove an expansion card:

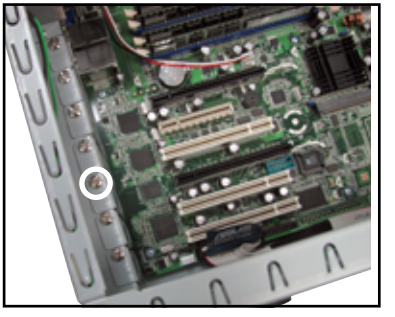
1. Remove the screw that secures the card to the chassis.



2. Carefully remove the card from the slot.



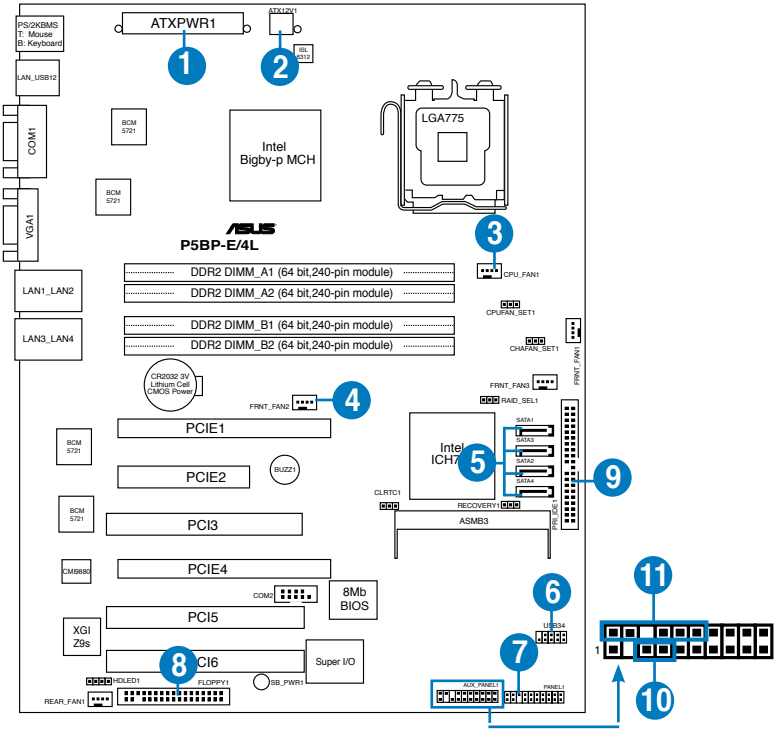
3. Reinstall the metal bracket and secure it to the chassis with the screw that you removed earlier.



2.9 Cable connections

- The bundled system cables are pre-connected before shipment. You do not need to disconnect these cables unless you will remove pre-installed components to install additional devices.
- Refer to Chapter 4 for detailed information on the connectors.

2.9.1 Motherboard connections



Standard cables connected to the motherboard

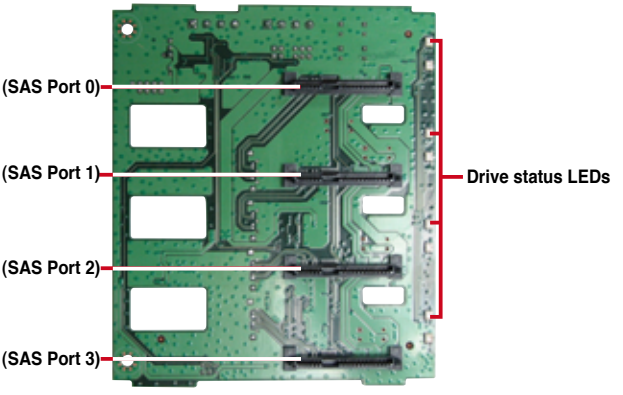
1. 24-pin ATX power
2. 4-pin 12V power
3. CPU_FAN1 (connected to the cooler)
4. FRNT_FAN2 (connected to the 12cm Rear Fan)
5. Serial ATA connectors [connected to the SATA backplane (PA4 model only)]
6. Front USB cable (connected to the front panel)
7. Front panel cable
8. Floppy disk drive
9. Primary IDE cable (connected to the optional drive)
10. Chassis Intrusion connector (connected to the rear chassis intrusion switch)
11. SMBus connector (connected to the backplane)

2.9.2 SATA/SAS backplane connections

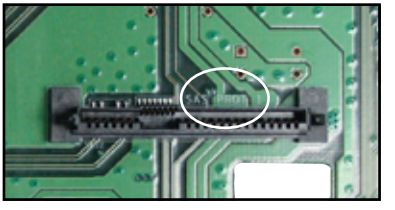
A SATA/SAS backplane comes pre-installed in the TS300-E5/PA4 and TS300-E5/PX4 model. The SATA/SAS backplane has four 22-pin SATA/SAS connectors to support Serial ATA hard disk drives and SAS hard disk drives. The backplane design incorporates a hot swap feature to allow easy connection or removal of SATA/SAS hard disks. The LEDs on the backplane connect to the front panel LEDs to indicate HDD status. See section "1.6 LED information" for details.

Front side

The front side of the SATA/SAS backplane faces the front panel when installed. This side includes four SATA/SAS connectors for the hot swap drive trays.



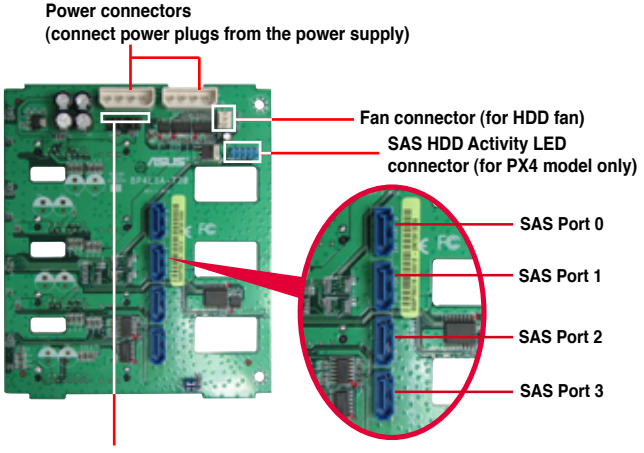
Each SATA/SAS connector is labeled (SAS PORT0, SAS PORT1, SAS PORT2, SAS PORT3) so you can easily determine their counterpart connectors at the back side of the backplane. Refer to the table for reference.



HDD Device	Front side connector	Back side connector
HDD 1	SAS1	SAS Port 0
HDD 2	SAS2	SAS Port 1
HDD 3	SAS3	SAS Port 2
HDD 4	SAS4	SAS Port 3

Back side

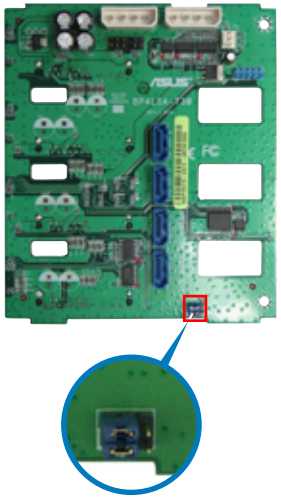
The back side of the SATA/SAS backplane faces the rear panel when installed. This side includes the power connectors, SATA/SAS interfaces for the motherboard Serial ATA connectors or the SAS card, an HDD fan connector, and SMBus connectors.



Upper 6-1 pins (J1): SMBus connector (connects the SMB cable from the AUX_PANEL1 connector on the motherboard)

SATA/SAS backplane jumper settings and HDD ID assignments

The 6-pin jumper J3 allows you to define your desired SATA/SAS configuration. The picture below shows the location of jumper J3 with pins 1-3 and 2-4 shorted.

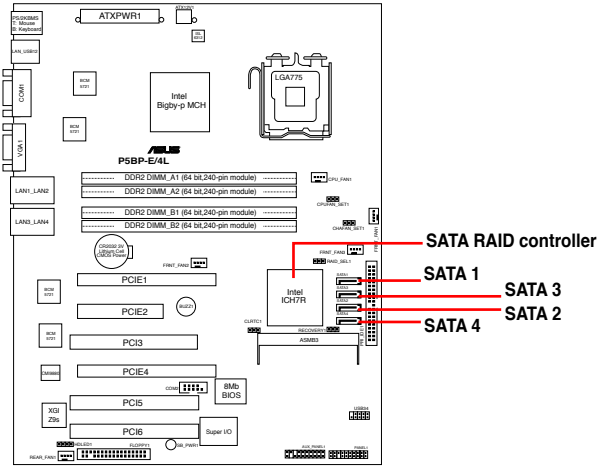


Refer to the table for the jumper settings and the appropriate ID# for each SATA HDD bay.

J3 setting (1-3 shorted, 2-4 shorted) 	
Device	**SATA/SAS ID**
Drive Bay 1	ID0
Drive Bay 2	ID1
Drive Bay 3	ID2
Drive Bay 4	ID3

(in PA4 model only)

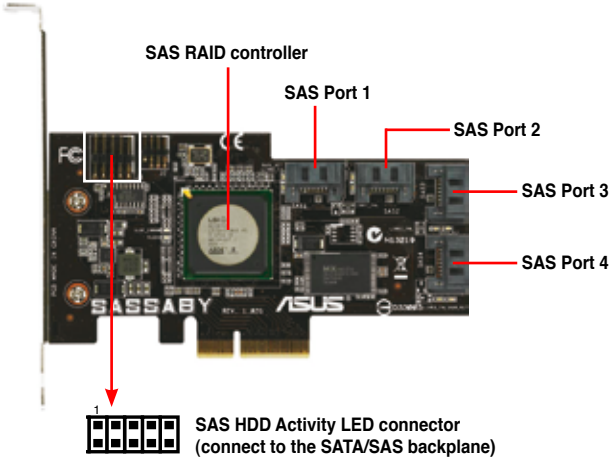
The back side of the SATA/SAS connectors are attached to the motherboard SATA connectors via the supplied SATA cables. Refer to the illustration below for the location of the SATA connectors. Refer to the table for the default SATA cable connections.



Backplane ID	SATA Port number	Connected to (on motherboard)	Controlled by
SAS Port 0	Port 0	SATA1	Intel® ICH7R
SAS Port 1	Port 1	SATA2	Intel® ICH7R
SAS Port 2	Port 2	SATA3	Intel® ICH7R
SAS Port 3	Port 3	SATA4	Intel® ICH7R

(in PX4 model only)

The back side of the SATA/SAS connectors are attached to the ASUS SASsaby 1064E SAS RAID controller card via the supplied SAS cables. Refer to the illustration below for the location of the SAS connectors. Refer to the table for the default SAS cable connections.



Backplane ID	SAS Port number	Connected to (on SASsaby 1064E)	Controlled by
SAS Port 0	Port 0	SAS Port 1	LSI SAS 1064E
SAS Port 1	Port 1	SAS Port 2	
SAS Port 2	Port 2	SAS Port 3	
SAS Port 3	Port 3	SAS Port 4	

2.10 Removable components

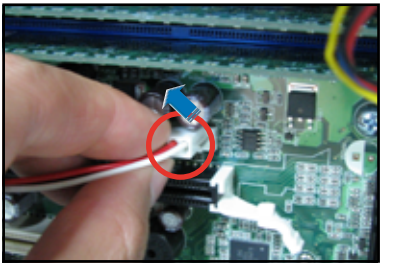
You may need to remove previously installed system components when installing or removing system devices, or when you need to replace defective components. This section tells how to remove the following components:

1. System fan
2. HDD blower (optional)
3. SATA/SAS backplane
4. Floppy disk drive module
5. Front I/O board
6. Chassis footpads and roller wheels
7. Power supply unit

2.10.1 System fan

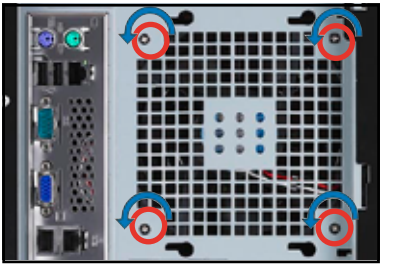
To remove the system fan:

1. Unplug the system fan cable from the FRNT_FAN2 connector on the motherboard.

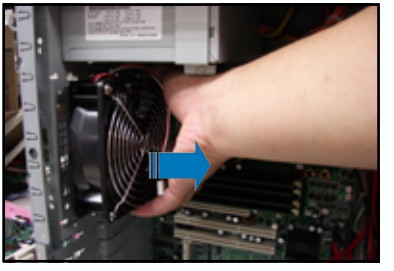


2. Locate the four screws that secure the fan to the chassis.
3. Remove the four screws while carefully supporting the system fan with your free hand to prevent it from falling off.

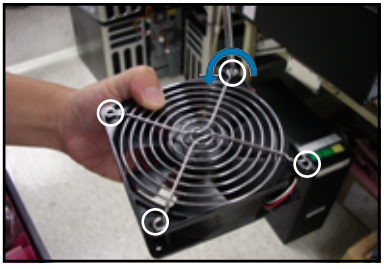
   Set the screws aside.



4. Carefully remove the system fan.

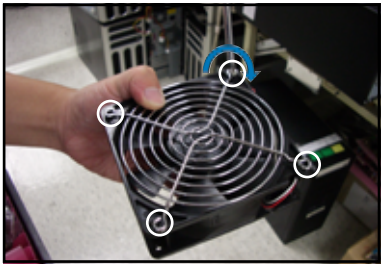


5. Remove the four screws that secure the metal shroud to the fan. Set the screws aside.

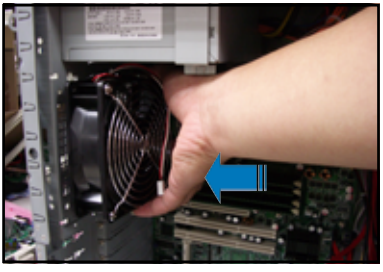


To reinstall the system fan:

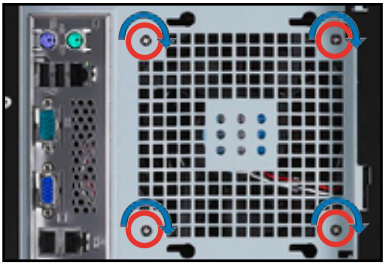
1. Drive in the four screws you removed earlier into the fan screw holes to secure the metal shroud to the fan.



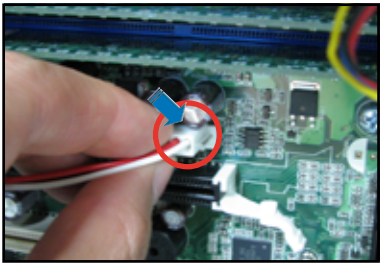
2. Align the system fan holes to the screw holes on the chassis.



3. Drive in the four screws you removed earlier to secure the fan to the chassis.



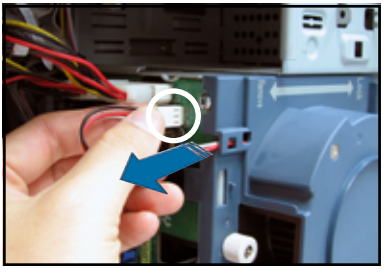
4. Plug the system fan cable to the connector FRNT_FAN2 on the motherboard.



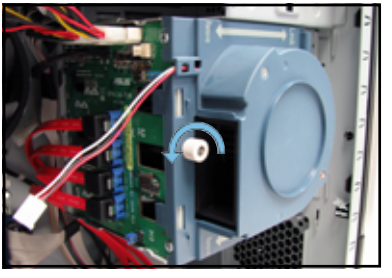
2.10.2 HDD blower (optional)

To remove the HDD blower:

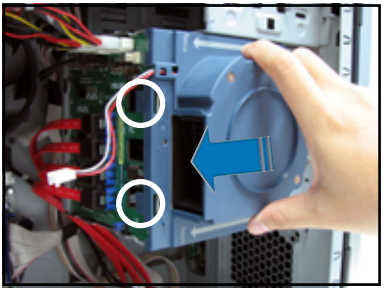
1. Remove the side cover. Refer to section **2.1.1 Removing the side cover** for instructions.
2. Disconnect the 3-pin fan cable from the fan connector on the backplane.



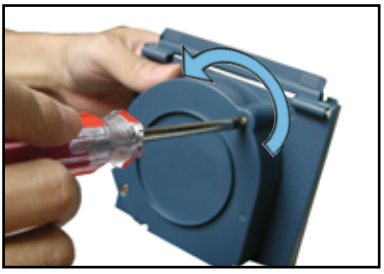
3. Loosen the thumb screw that secures the HDD blower case to the chassis.



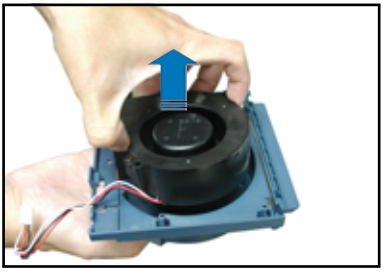
4. Firmly grip the blower case as shown, then slide it out of the chassis in the direction of the arrow until the tabs are released from the holes of the HDD cage.



5. Remove the two screws on the blower case using a Phillips screwdriver. Set the screws aside.

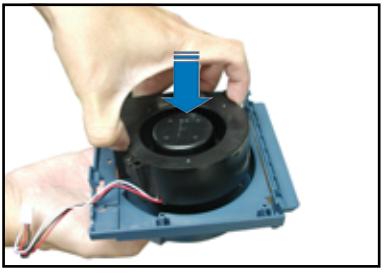


6. Remove the blower from the case.

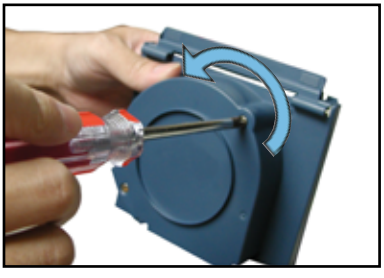


To reinstall the HDD blower:

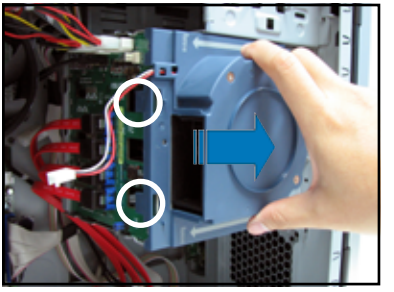
1. Replace the blower into the case.



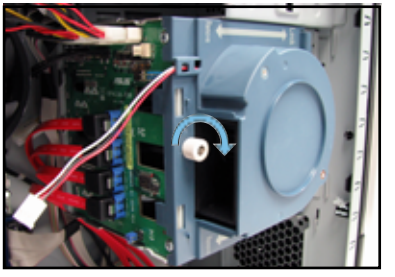
2. Secure the blower to the case with the two screws you removed earlier.



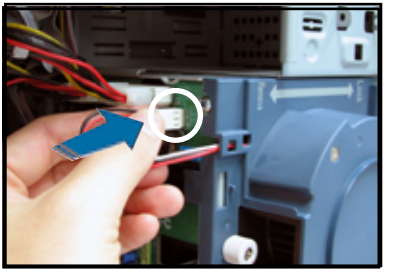
3. Slide in the blower case as shown, making sure the tabs fit into the holes on the HDD cage.



4. Drive in the thumb screw to secure the HDD blower case.



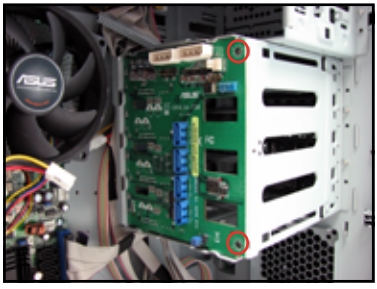
5. Connect the 3-pin fan cable to the fan connector on the backplane.



2.10.3 SATA/SAS backplane

To remove the SATA/SAS backplane:

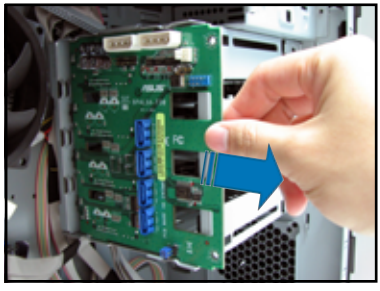
1. Remove the HDD blower case. Refer to section **2.10.2 HDD blower** for instructions.
2. Disconnect all cables from the SATA/SAS backplane.



When disconnecting a cable, hold and firmly pull the cable plug. DO NOT pull the cable itself. Doing so may damage the cable!

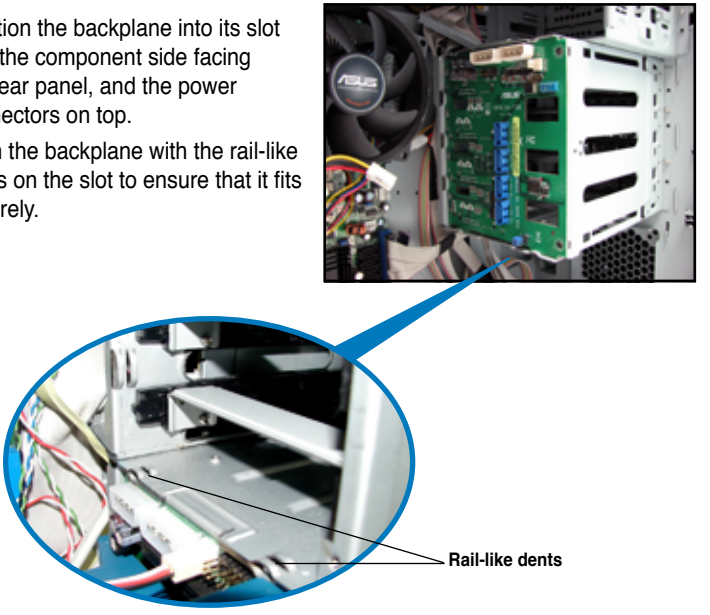
3. Remove the 2 screws on the backplane.

4. From the inner edge, push the backplane outward so that the outer edge protrudes slightly from the slot.
5. From the outer edge, firmly hold the backplane and carefully slide it out.

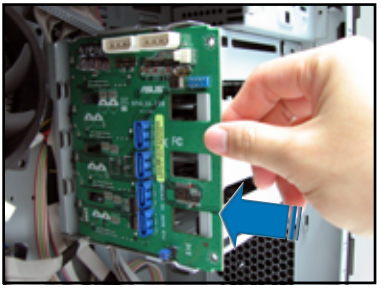


To reinstall a SATA/SAS backplane:

1. Position the backplane into its slot with the component side facing the rear panel, and the power connectors on top.
2. Align the backplane with the rail-like dents on the slot to ensure that it fits securely.



3. Slide the backplane into the slot until it fits. If correctly installed, the outer edge of the backplane aligns with the corner of the drive cage.
4. Fasten the 2 screws on the backplane.
5. Connect the appropriate cables to the backplane. Refer to section **2.9.2 SATA/SAS backplane connections** for details.



2.10.4 Floppy disk drive

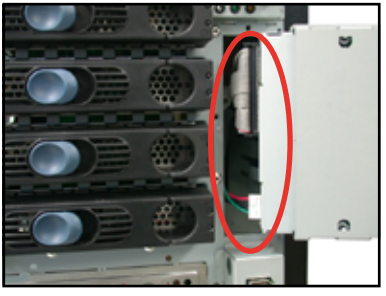
You need to remove the front panel assembly before you can remove the floppy disk drive. Refer to section **2.5.1 Removing the front panel assembly** for instructions.

To remove the floppy disk drive:

1. Remove the screw that secures the drive to the chassis.

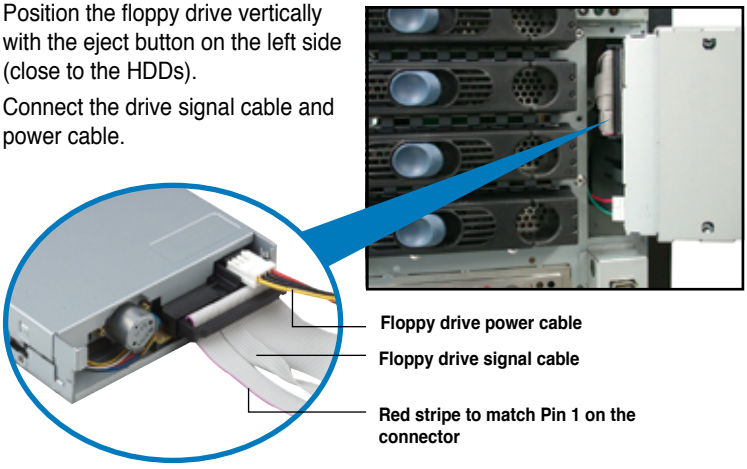
2. Carefully pull out the drive from the chassis until you see the cables connected to the drive.

3. Disconnect the floppy disk cable and power cable from the drive to completely release the drive.

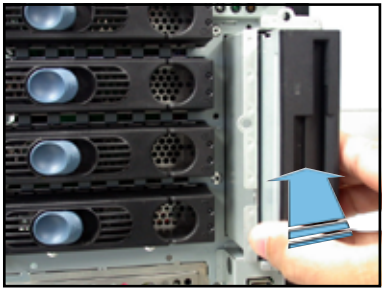


To install a floppy disk drive:

1. Position the floppy drive vertically with the eject button on the left side (close to the HDDs).
2. Connect the drive signal cable and power cable.



3. Carefully push the drive into the bay until the drive cage fits the front edge of the bay.



4. Secure the drive cage with a screw.

2.10.5 Front I/O board

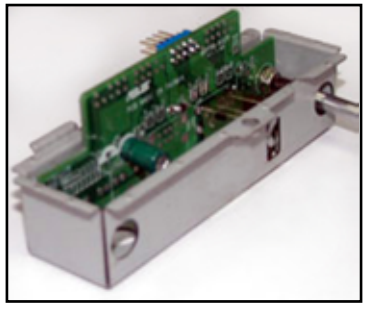
You need to remove the front panel assembly before you can remove the front I/O board. Refer to section **2.5.1 Removing the front panel assembly** for instructions.

To remove the front I/O board:

1. Remove the screw that secures the front I/O board bracket to the front panel.

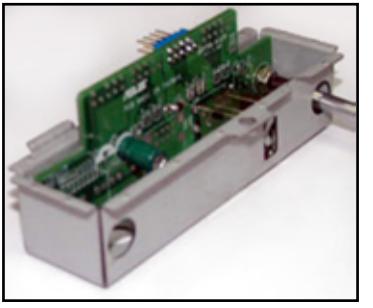
2. Carefully pull out the bracket until you see the cables connected to the I/O board.
3. Disconnect all the cables from the I/O board.

4. Remove the screw that secures the I/O board to the bracket.

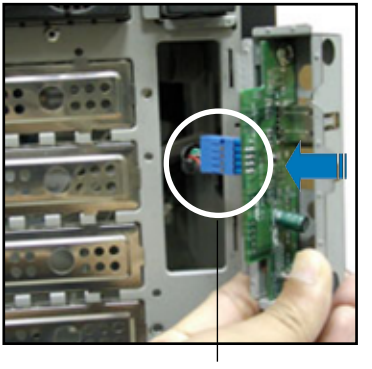


To install the front I/O board:

1. Place the I/O board in the bracket, component side up. Secure the front I/O board to the bracket with a screw.

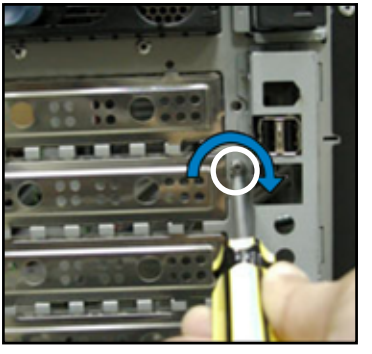


2. Position the I/O board into the bay with the component side to the left (close to the HDDs). Connect the I/O cables to the connectors on the back of the I/O board.



USB 2.0 connector

3. Insert the I/O board into the bay until the bracket fits the front edge of the bay.
4. Secure the I/O board bracket with a screw.



2.10.6 Chassis footpads and roller wheels

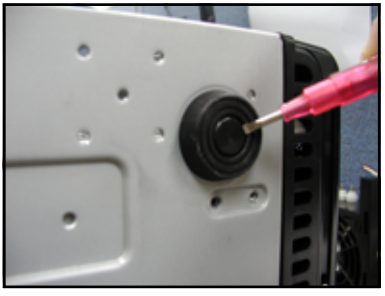
The barebone server system is shipped with four footpads attached to the bottom of the chassis for stability. You need to remove these footpads if:

- if you want to replace the footpads with the bundled roller wheels
- you wish to install the system to a rack

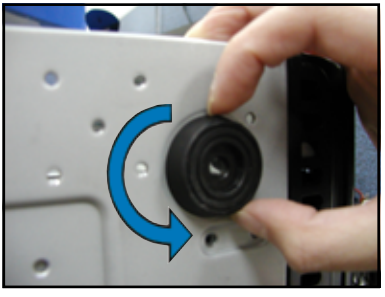
  (Refer to **Chapter 3: Installation options** of this user guide, and to the "Rackmount Kit" user guide for instructions)

To remove the footpads:

1. Lay the system chassis on its side.
2. Use a flat screwdriver to flip out the top layer of a footpad.



3. Remove the footpad by rotating it counterclockwise.

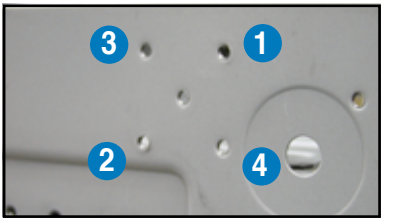


4. Repeat steps 2 and 3 to remove the other three footpads.

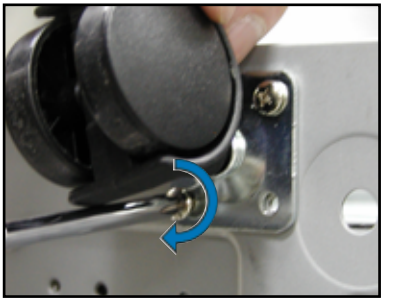
For convenient transport, install the roller wheels the came with the system package. Each wheel has a brake lock to stabilize the chassis in place.

To install the chassis wheels:

1. Lay the chassis in its side.
2. Locate the designated screw holes for each of the four wheel sets. Take note of the numbers alongside each hole when placing screws.



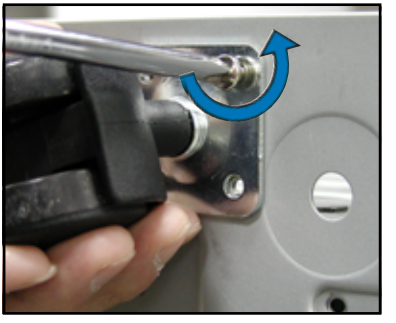
3. Secure each wheel to the bottom of the chassis using four screws.
4. Repeat steps 2 and 3 to install the other three wheels.



Remove the chassis roller wheels if you wish to mount the system to a rack.

To remove the chassis wheels:

1. Lay the system chassis on its side.
2. Use a Phillips screwdriver to remove the screws that secure the wheels to the bottom of the chassis.
3. Repeat step 2 to remove the other three roller wheels.

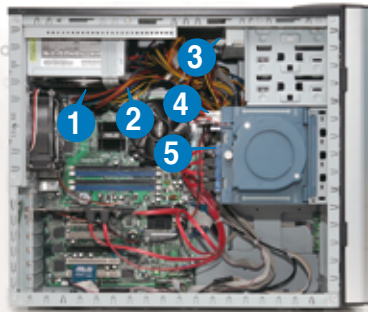


2.10.7 Power supply unit

Refer to this section when removing or installing a power supply unit to the barebone system.

You MUST disconnect all power cable plugs from the motherboard and other installed devices before removing the power supply unit.

The picture below shows the motherboard and device connectors where the power plugs are connected. Refer to the Appendix at the end of this document for the power supply specifications.



Model PA4

1. 24-pin ATX *(motherboard power connector)*
2. 4-pin +12V *(motherboard power connector, hidden behind the cables)*
3. 4-pin plug *(optical drive)*
4. 2 x 4-pin plugs *(SATA backplane)*
5. 4-pin plug *(floppy disk drive, hidden behind the backplane)*

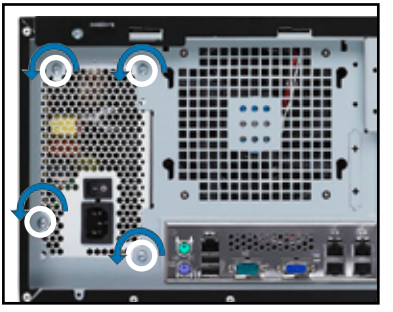
Model PX4

1. 24-pin ATX *(motherboard power connector)*
2. 4-pin +12V *(motherboard power connector, hidden behind the cables)*
3. 4-pin plug *(optical drive)*
4. 2 x 4-pin plugs *(SAS backplane)*
5. 4-pin plug *(floppy disk drive, hidden behind the backplane)*

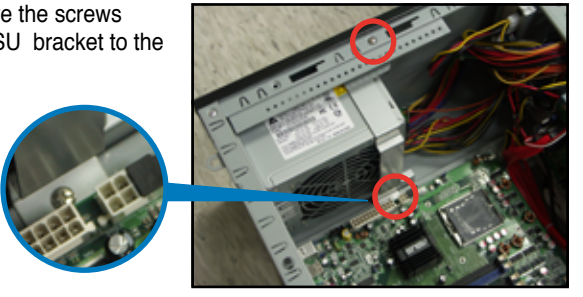
Make sure to unplug ALL power cables from the system devices before removing the power supply unit.

To remove the power supply unit (PSU):

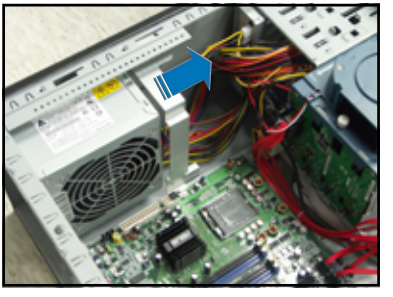
1. Remove the chassis cover. Refer to section **2.1.1 Removing the side cover**.
2. Remove the front panel assembly. Refer to section **2.5.1 Removing the front panel assembly**.
3. Lay the chassis on a flat, stable surface.
4. Locate the four screws on the rear panel. Remove the screws and set them aside.



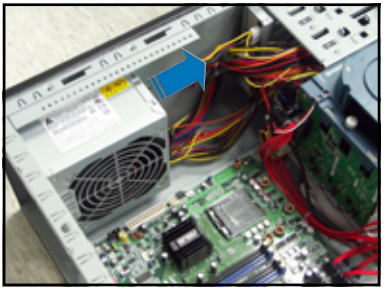
5. Locate and remove the screws that secure the PSU bracket to the chassis.



6. Slide the bracket in the direction of the arrow and remove it from the chassis.



7. Carefully slide the PSU in the direction of the arrow until it disengages from the chassis.

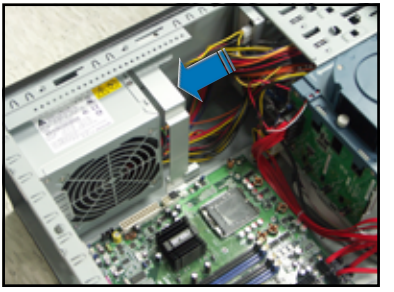


To reinstall the power supply unit:

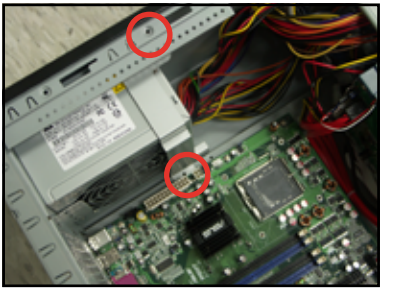
1. Carefully slide the PSU in the direction of the arrow.

2. Secure the PSU to the chassis with the four screws you removed earlier.

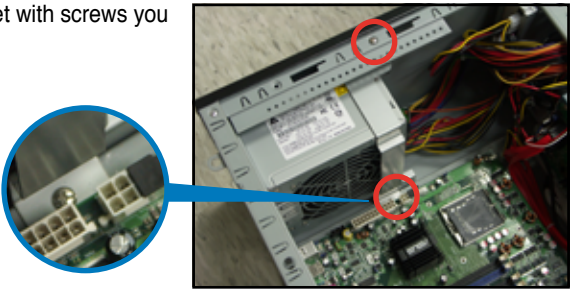
3. Slide in the PSU bracket.



4. Align the screw holes.



5. Secure the bracket with screws you removed earlier.



Chapter 3

This chapter describes how to install optional components into the barebone server.

Installation option

3.1 Preparing the system for rack mounting

- The items required for the optional configurations described in this chapter are not included in the standard barebone system package. These items are purchased separately.
- We recommend that you allot at least 1U space above the server system to ensure optimal thermal performance.

3.1.1 Removing the footpads or roller wheels

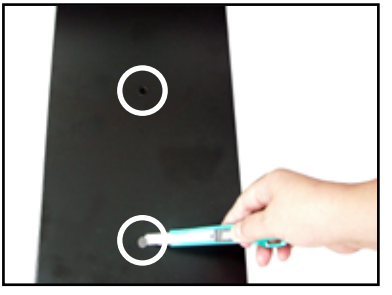
Refer to section **2.10.6 Chassis footpads and roller wheels** for instructions on removing the footpads or roller wheels.

3.1.2 Removing the top cover

To remove the top cover

1. Remove the chassis cover. Refer to section **2.1.1 Removing the side cover**.
2. Remove the front panel assembly. Refer to section **2.5.1 Removing the front panel assembly**.
3. Carefully slide out the protruding portion of the top cover as shown.

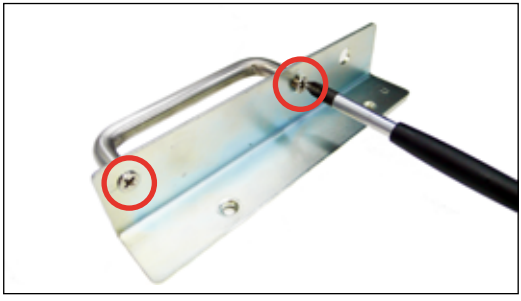
4. Locate two round mylars on top cover.
5. Carefully remove each mylar using a sharp, flat object such as the edge of a cutter.



3.2 Attaching the mounting ears

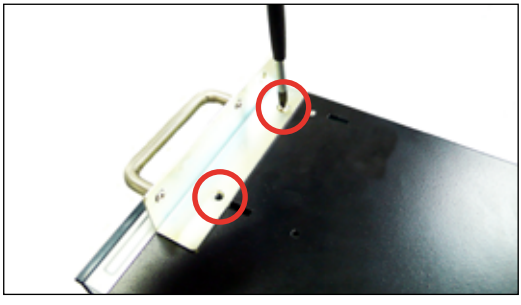
To attach the mounting ears:

1. Take out two handles and metal brackets from the package.
2. Secure the handles to the metal brackets with screws.



3. Remove four screws from the chassis bottom.

4. Align one mounting ear with the holes on the top of the chassis and secure it with screws.

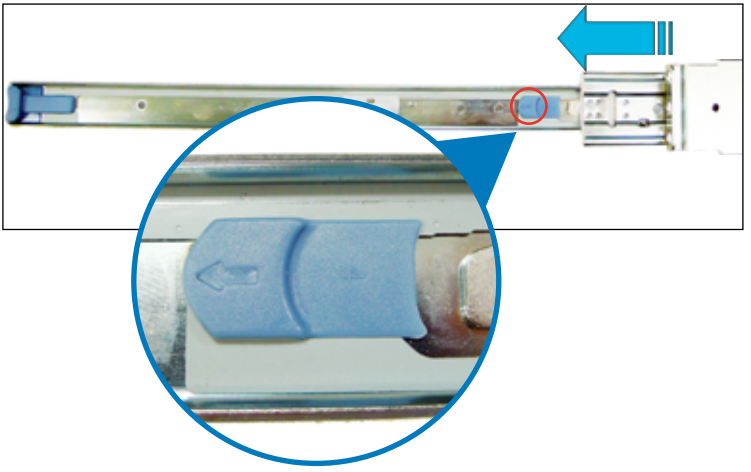


5. Repeat the step 4 to attach the second mounting ear to the chassis bottom.

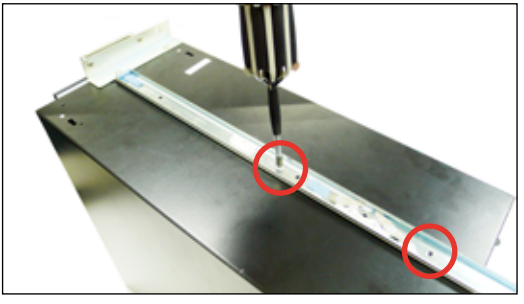
3.3 Attaching the inner rail to the server

To attach the inner rail:

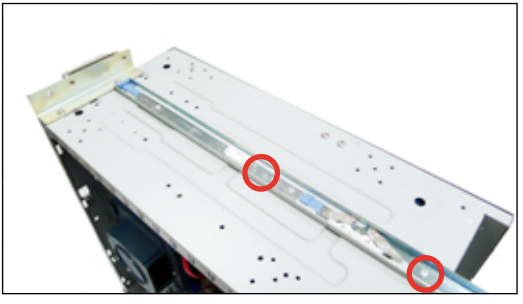
1. Slide out the inner rail of the rail kit and pull the slide extension tab to release the inner rail from the kit.



2. Align the screw holes on the inner rail and the chassis top, then secure the inner rail to the chassis top with screws.



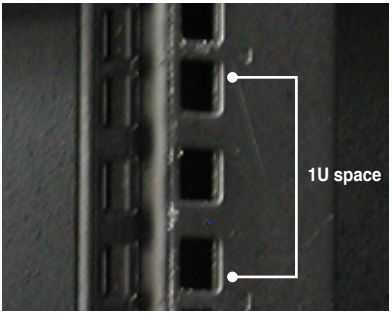
3. Repeat the previous steps to secure the other inner rail to the bottom of the chassis with screws.



3.4 Attaching the rack rails

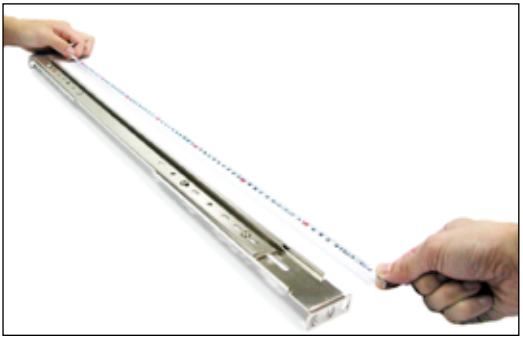
To attach the rack rails:

1. Select one unit of space (1U) on the rack where you want to install the server.
2. Install the nuts on the holes of the 1U space on the rack front and the corresponding rack rear.

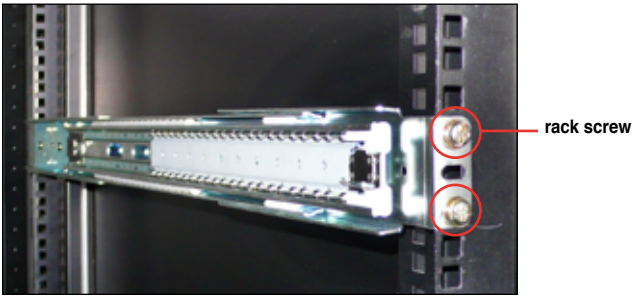


3. Measure the depth of the rack for the length of the rack rails.

4. Adjust the rack rail length to fit the rack.



5. Position the rack rail to the 1U space on the rack with the nuts installed and secure both the front end and the rear end of the rail with two rack screws each.

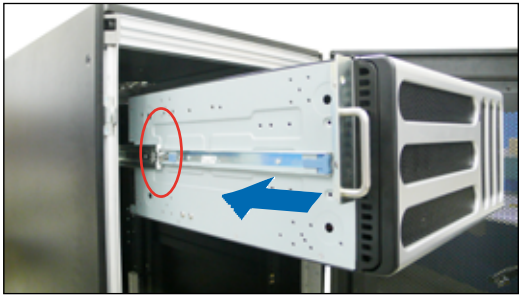


6. Repeat steps 1–5 to assemble and attach the rack rail on the other side. Ensure that it is level with the previously installed rack rail.

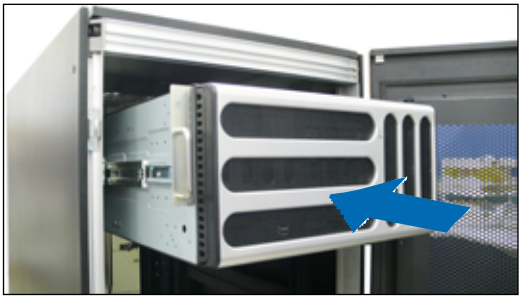
3.5 Mounting the server to the rack

To mount the server to the rack:

1. Align the server rails with the rack rails.



2. Push the server all the way into the rack.



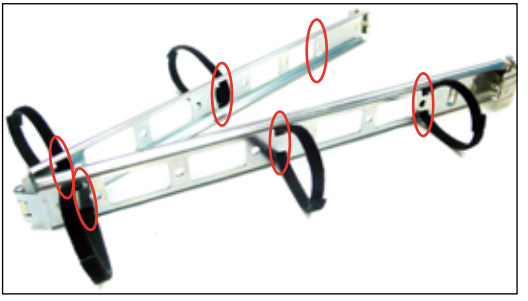
3. Secure the server to the rack with two screws.

3.6 Installing the cable manager

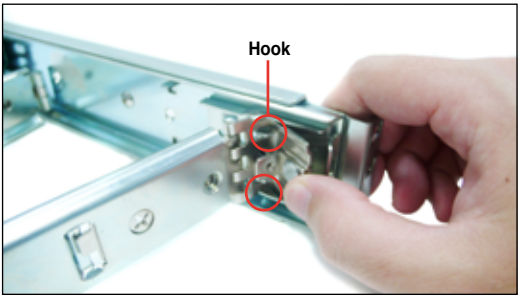
To install the cable manager:

For demonstration purposes, all the photos in this section are taken out of the rack cabinet.

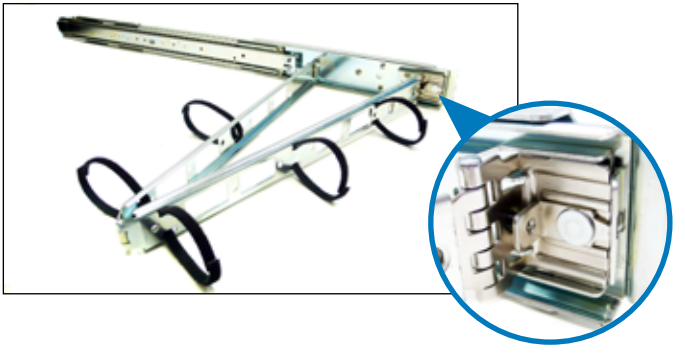
1. Thread the cabling straps into cable holes on the cable manager arm.



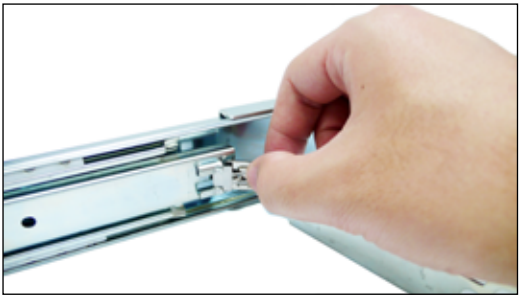
2. Hook the rear pivoting end of the cable manager to the rear end of the rack rail and press the tab to retain the rear end.



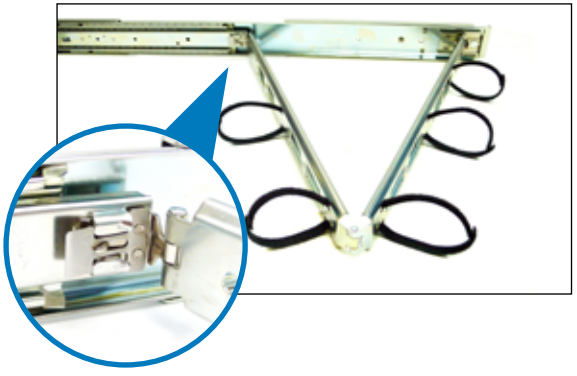
The rear pivoting end of the cable manager is fastened in place as shown.



3. Connect the front pivoting end of the cable manager to the inner rail which has been attached to the server.



The front pivoting end of the cable manager is in place as shown.



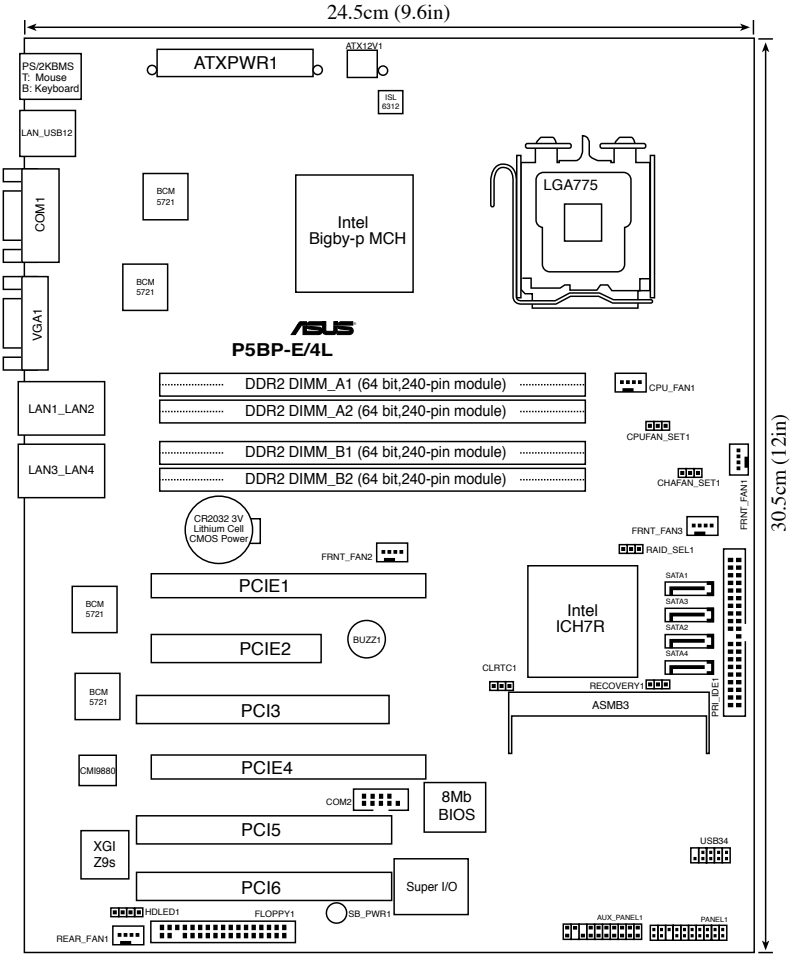
Chapter 4

This chapter gives information about the motherboard that comes with the server. This chapter includes the motherboard layout, jumper settings, and connector locations.

Motherboard info

4.1 Motherboard layouts

P5BP-E/4L model

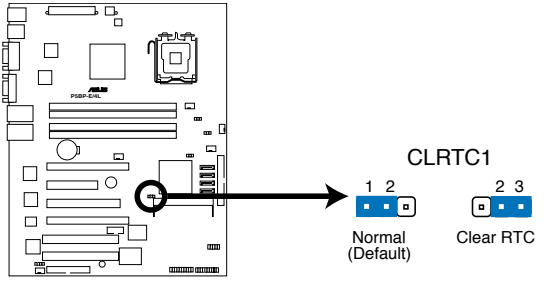


Layout contents

4.2 Jumpers

1. Clear RTC RAM (CLRTC1)

This jumper allows you to clear the Real Time Clock (RTC) RAM in CMOS. You can clear the CMOS memory of date, time, and system setup parameters by erasing the CMOS RTC RAM data. The onboard button cell battery powers the RAM data in CMOS, which include system setup information such as system passwords.



P5BP-E/4L Clear RTC RAM

To erase the RTC RAM:

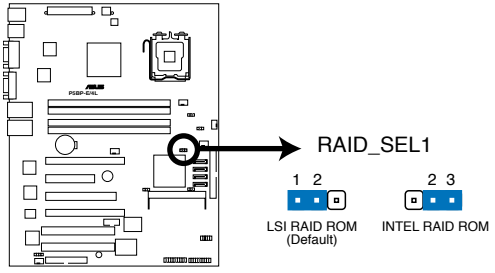
1. Turn OFF the computer and unplug the power cord.
2. Move the jumper cap from pins 1-2 (default) to pins 2-3. Keep the cap on pins 2-3 for about 5~10 seconds, then move the cap back to pins 1-2.
3. Plug the power cord and turn ON the computer.
4. Hold down the <Del> key during the boot process and enter BIOS setup to re-enter data.

Except when clearing the RTC RAM, never remove the cap on CLRTC jumper default position. Removing the cap will cause system boot failure!

If the steps above do not help, remove the onboard battery and move the jumper again to clear the CMOS RTC RAM data. After the CMOS clearance, reinstall the battery.

2. RAID controller selection (3-pin RAID_SEL1)

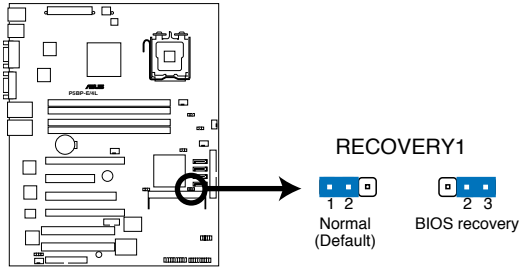
This jumper allows you to select the RAID configuration utility to use when you create disk arrays. Place the jumper caps over pins 1-2 if you want to use the LSI Logic Embedded SATA RAID Setup Utility (default); otherwise, place the jumper caps to pins 2-3 to use the Intel® Matrix Storage Manager.



P5BP-E/4L RAID_SEL1 Setting

3. Force BIOS recovery setting (3-pin RECOVERY1)

This jumper allows you to quickly update or recover the BIOS when it gets corrupted.



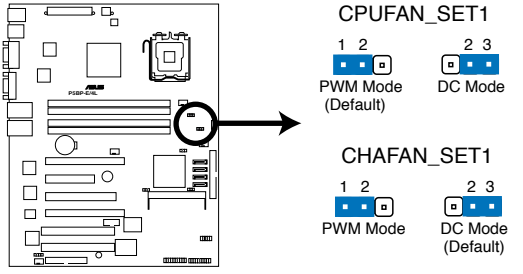
P5BP-E/4L BIOS Recovery Setting

To update the BIOS

1. Prepare a floppy disk that contains the latest BIOS for the motherboard (xxxx-xxx.ROM) and the AFUDOS.EXE utility.
2. Set the jumper to pins 2-3.
3. Insert the floppy disk then turn on the system to update the BIOS.
4. Shut down the system.
5. Set the jumper back to pins 1-2.
6. Turn on the system.

4. Fan mode setting (3-pin CPUFAN_SET1 and CHAFAN_SET1)

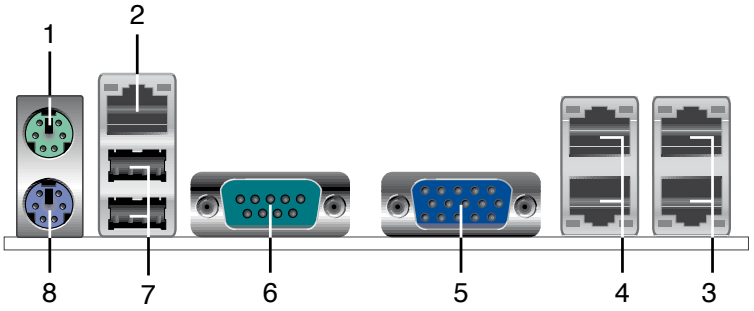
These jumpers allow you to connect either a 3-pin or a 4-pin fan cable plug to the CPU fan or Chasis fan connectors Set these jumpers to pins 1-2 Short PWM mode if you are using a 4-pin fan cable plug, or to pins 2-3 Short DC mode if you are using a 3-pin plug.



P5BP-E/4L Fan Mode Setting

4.3 Connectors

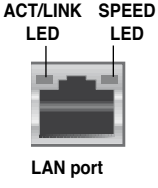
4.3.1 Rear panel connectors



1. **PS/2 mouse port (green).** This port is for a PS/2 mouse.
2. **LAN port.** This port is for upcoming ASMB3-iKVM controller card only and does not support common network connections..
3. **Dual integrated Gigabit Ethernet connections LAN1_LAN2.** These ports allow Gigabit connection to a Local Area Network (LAN) through a network hub. (The bottom one is LAN1.) Refer to the table below for the LAN port LED indications.
4. **Dual integrated Gigabit Ethernet connections LAN3_LAN4.** These ports allow Gigabit connection to a Local Area Network (LAN) through a network hub. (The bottom one is LAN3.) Refer to the table below for the LAN port LED indications.
5. **VGA port.** This port is for a VGA monitor or other VGA-compatible devices.
6. **Serial (COM1) port.** This 9-pin communication port is for pointing devices or other serial devices.
7. **USB 2.0 ports 1 and 2.** These two 4-pin Universal Serial Bus (USB) ports are available for connecting USB 2.0 devices.
8. **PS/2 keyboard port (purple).** This port is for a PS/2 keyboard.

LAN port LED indications

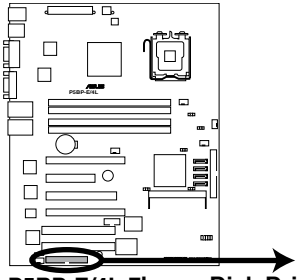
Activity/Link LED		Speed LED	
Status	Description	Status	Description
OFF	No link	OFF	10 Mbps connection
ORANGE	Linked	ORANGE	100 Mbps connection
BLINKING	Data activity	GREEN	1 Gbps connection



4.3.2 Internal connectors

1. Floppy disk drive connector (34-1 pin FLOPPY1)

This connector is for the provided Floppy Disk Drive (FDD) signal cable. Insert one end of the cable to this connector, then connect the other end to the signal connector at the back of the floppy disk drive.

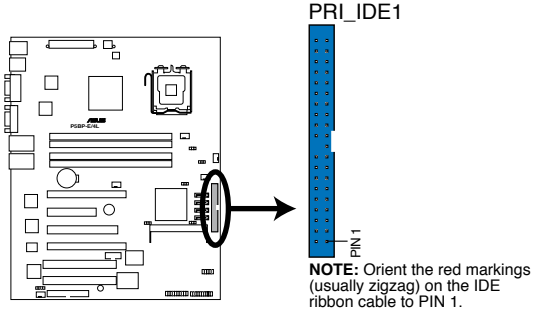


P5BP-E/4L Floppy Disk Drive Connector

Pin 5 on the connector is removed to prevent incorrect cable connection when using a FDD cable with a covered Pin 5.

2. ICH7R Primary IDE connector (40-1 pin PRI_IDE1)

The onboard IDE connector is for the Ultra DMA 133/100 signal cable. There are three connectors on each Ultra DMA 133/100 signal cable: blue, black, and gray. Connect the blue connector to the motherboard's IDE connector, then select one of the following modes to configure your device.



P5BP-E/4L IDE Connector

	Drive jumper setting	Mode of device(s)	Cable connector
Single device	Cable-Select or Master	-	Black
Two devices	Cable-Select	Master	Black
		Slave	Gray
	Master	Master	Black or gray
	Slave	Slave	

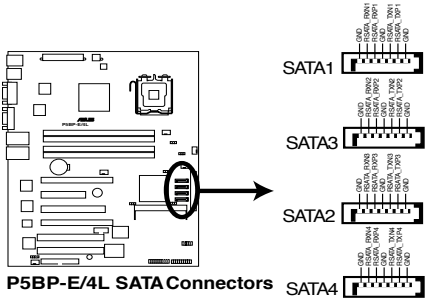
- Pin 20 on the IDE connector is removed to match the covered hole on the Ultra ATA cable connector. This prevents incorrect insertion when you connect the IDE cable.
- Use the 80-conductor IDE cable for Ultra ATA 100/66/33 IDE devices.

If any device jumper is set as "Cable-Select," make sure all other device jumpers have the same setting.

3. Serial ATA connectors (7-pin SATA1-4)

These connectors are for the Serial ATA signal cables for Serial ATA hard disk drives.

If you installed Serial ATA hard disk drives, you can create a RAID 0, RAID 1, RAID 10 and RAID 5 configuration using the Intel® Matrix Storage Technology or RAID 0, RAID 1 and RAID 10 configuration using the LSI MegaRAID® utility embedded in the Intel® ICH7R Southbridge.



P5BP-E/4L SATA Connectors

These connectors are set **IDE** mode by default. In **IDE** mode, you can connect Serial ATA boot/data hard disk drives to these connectors. If you intend to create a Serial ATA RAID set using these connectors, set the **Configure SATA as** item in the BIOS to [RAID]. See section **4.3.4 IDE Configuration** for details.

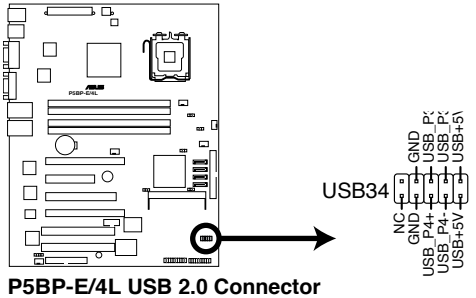
- Use only two Serial ATA RAID connectors for each RAID 0 or RAID 1 set.
- When using the connectors in **IDE** mode, connect the primary (boot) hard disk drive to the SATA1 or SATA2 connector. Refer to the table below for the recommended SATA hard disk drive connections.

Serial ATA hard disk drive connection

Connector	Setting	Use
SATA1/SATA2	Master	Boot disk
SATA3/SATA4	Slave	Data disk

4. USB connector (10-1 pin USB34)

This connector is for USB 2.0 ports. Connect the USB module cable to this connector, then install the module to a slot opening at the back of the system chassis. This USB connector complies with USB 2.0 specification that supports up to 480 Mbps connection speed.

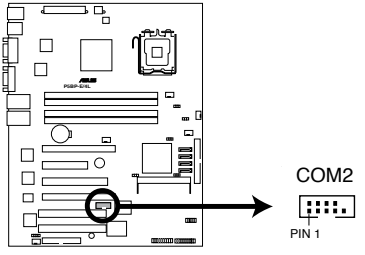


P5BP-E/4L USB 2.0 Connector

The USB port module is purchased separately.

5. Serial port connector (10-1 pin COM2)

This connector is for a serial (COM) port. Connect the serial port module cable to this connector, then install the module to a slot opening at the back of the system chassis.



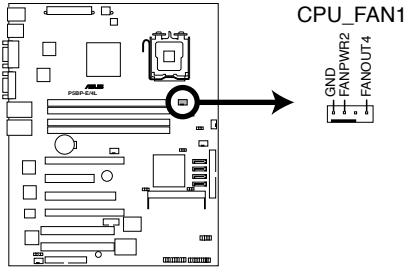
P5BV-E/4L COM Port Connector

The Serial port module is purchased separately.

6. CPU fan connector (4-pin CPU_FAN1)

The fan connector supports cooling fan of 350 mA ~ 740 mA (8.88 W max.) or a total of 2.1 A ~ 4.44 A (53.28 W max.) at +12V. Connect the fan cables to the fan connectors on the motherboard, making sure that the black wire of each cable matches the ground pin of the connector.

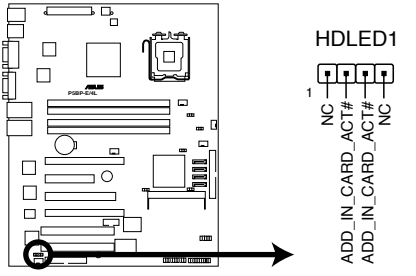
Do not forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components. These are not jumpers! Do not place jumper caps on the fan connectors!



P5BP-E/4L CPU Fan Connector

7. Hard disk activity LED connector (4-pin HDLED1)

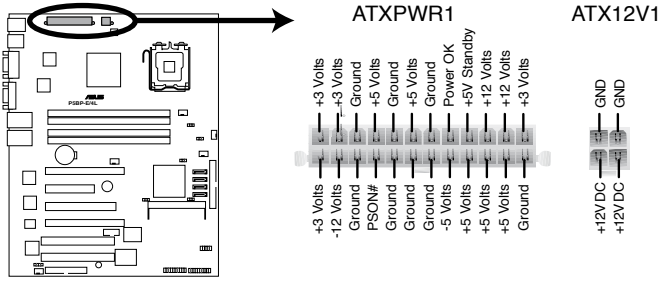
This connector supplies power to the hard disk activity LED. The read or write activities of any device connected to the SCSI connectors or the SATA connectors cause this LED to light up.



P5BV-E/4L Card Activity LED Connector

8. ATX power connectors (24-pin ATXPWR1, 4-pin ATX12V1)

These connectors are for SSI power supply plugs. The power supply plugs are designed to fit these connectors in only one orientation. Find the proper orientation and push down firmly until the connectors completely fit.

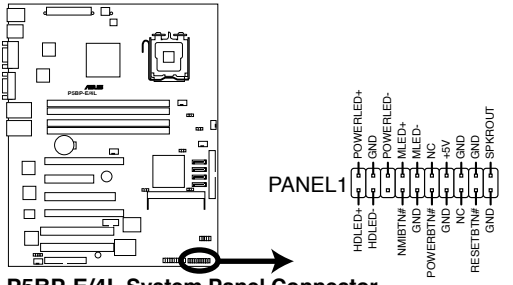


P5BV-E/4L ATX Power Connector

- For a fully configured system, we recommend that you use a power supply unit (PSU) that complies with ATX 12 V Specification 2.0 (or later version) and provides a minimum power of 400 W.
- Do not forget to connect the 8-pin / 4-pin EATX12V power plug; otherwise, the system will not boot.
- Use of a PSU with a higher power output is recommended when configuring a system with more power-consuming devices. The system may become unstable or may not boot up if the power is inadequate.
- If you want to use two high-end PCI Express x16 cards, use a PSU with 500W to 600W power or above to ensure the system stability.
- If you are uncertain about the minimum power supply requirement for your system, refer to the **Recommended Power Supply Wattage Calculator** at http://support.asus.com/PowerSupplyCalculator/PSCalculator.aspx?SLanguage=en-us for details.

9. System panel connector (20-pin PANEL1)

This connector supports several chassis-mounted functions.



P5BP-E/4L System Panel Connector

- **System power LED (Green 3-pin PLED)**

  This 3-pin connector is for the system power LED. Connect the chassis power LED cable to this connector. The system power LED lights up when you turn on the system power, and blinks when the system is in sleep mode.

- **Message LED (Brown 2-pin MLED)**

  This connector is for the message LED cable that connects to the front message LED. The message LED indicates the booting status. The LED blinks when the system is in the boot process until the operating system is loaded.

- **Hard disk drive activity LED (Red 2-pin IDE_LED)**

  This 2-pin connector is for the HDD Activity LED. Connect the HDD Activity LED cable to this connector. The IDE LED lights up or flashes when data is read from or written to the HDD.

- **System warning speaker (Orange 4-pin SPEAKER)**

  This 4-pin connector is for the chassis-mounted system warning speaker. The speaker allows you to hear system beeps and warnings.

- **ATX power button/soft-off button (Light Green 2-pin PWRSW)**

  This connector is for the system power button. Pressing the power button turns the system on or puts the system in sleep or soft-off mode depending on the BIOS settings. Pressing the power switch for more than four seconds while the system is ON turns the system OFF.

- **Reset button (Blue 2-pin RESET)**

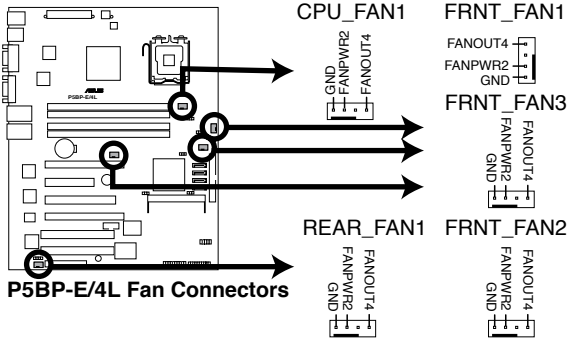
  This 2-pin connector is for the chassis-mounted reset button for system reboot without turning off the system power.

The system panel connector is color-coded for easy connection.

10. CPU, Rear, and Front fan connectors (CPU_FAN1, 4-pin FRNT_FAN1-3, 4-pin REAR_FAN1)

The fan connectors support cooling fans of 350 mA ~ 2000 mA (24 W max.) or a total of 1 A ~ 3.48 A (41.76 W max.) at +12V. Connect the fan cables to the fan connectors on the motherboard, making sure that the black wire of each cable matches the ground pin of the connector.

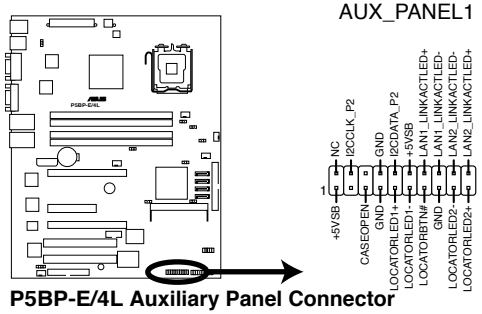
Do not forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components. These are not jumpers! Do not place jumper caps on the fan connectors!



P5BP-E/4L Fan Connectors

11. System panel auxiliary connector (20-pin AUX_PANEL1)

This connector supports several server system functions.



P5BP-E/4L Auxiliary Panel Connector

- **Chassis Intrusion connector (3-pin CASEOPEN)**

  This lead is for a chassis with an intrusion detection feature. This requires an external detection mechanism such as a chassis intrusion sensor or microswitch. When you remove any chassis component, the sensor triggers and sends a high-level signal to this lead to record a chassis intrusion event.

- **LAN1 link activity LED (2-pin LAN1_LINKACTLED)**

  This 2-pin connector is for the LAN1 Activity LED. Connect the LAN1 Activity LED cable to this connector. This LED blinks during a network activity and is always lit when linked.

- **LAN2 link activity LED (2-pin LAN2_LINKACTLED)**

  This 2-pin connector is for the LAN2 Activity LED. Connect the LAN2 Activity LED cable to this connector. This LED blinks during a network activity and lights up when linked.

- **Locator LED 1 (2-pin LOCATORLED1)**

  This 2-pin connector is for the Locator LED 1. Connect the Locator LED 1 cable to this connector. This LED lights up when the Locator button is pressed.

- **Locator LED 2 (2-pin LOCATORLED2)**

  This 2-pin connector is for the Locator LED 2. Connect the Locator LED 2 cable to this connector.

- **Locator Button/Switch (2-pin LOCATORBTN)**

  This connector is for the locator button. This button queries the state of the system locator.

- **Front Panel SMBus (6-1 pin)**

  This connector allows you to connect SMBus (System Management Bus) devices to the system front panel. Devices communicate with an SMBus host and/or other SMBus devices using the SMBus interface.

Chapter 5

This chapter tells how to change system settings through the BIOS Setup menus and describes the BIOS parameters.

BIOS information

5.1 Managing and updating your BIOS

The following utilities allow you to manage and update the motherboard Basic Input/Output System (BIOS) setup.

1. **ASUS AFUDOS** (Updates the BIOS in DOS mode using a bootable floppy disk.)
2. **ASUS CrashFree BIOS 3** (Updates a corrupted BIOS file using the USB flash disk or the floppy disk that contains the updated BIOS file.)

Refer to the corresponding sections for details on these utilities.

Save a copy of the original motherboard BIOS file to a bootable floppy disk in case you need to restore the BIOS in the future. Copy the original motherboard BIOS using the AFUDOS utility.

5.1.1 Creating a bootable floppy disk

1. Do either one of the following to create a bootable floppy disk.

   DOS environment

   a. Insert a 1.44MB floppy disk into the drive.
   b. At the DOS prompt, type **`format A:/S`** then press <Enter>.

   Windows® Server environment

   a. Insert a 1.44 MB floppy disk to the floppy disk drive.
   b. Click **Start** from the Windows® desktop, then select **My Computer**.
   c. Select the **3 1/2 Floppy Drive** icon.
   d. Click **File** from the menu, then select **Format**. A Format 3 1/2 Floppy Disk window appears.
   e. Select **Create an MS-DOS startup disk** from the format options field, then click **Start**.

2. Copy the original or the latest motherboard BIOS file to the bootable floppy disk.

5.1.2 AFUDOS utility

The AFUDOS utility allows you to update the BIOS file in DOS environment using a bootable floppy disk with the updated BIOS file. This utility also allows you to copy the current BIOS file that you can use as backup when the BIOS fails or gets corrupted during the updating process.

Copying the current BIOS

To copy the current BIOS file using the AFUDOS utility:

- Make sure that the floppy disk is not write-protected and has at least 1024 KB free space to save the file.
- The succeeding BIOS screens are for reference only. The actual BIOS screen displays may not be the same as shown.

1. Copy the AFUDOS utility (afudos.exe) from the motherboard support CD to the bootable floppy disk you created earlier.
2. Boot the system in DOS mode, then at the prompt type:

   afudos /o[filename]

   where the [filename] is any user-assigned filename not more than eight alphanumeric characters for the main filename and three alphanumeric characters for the extension name.

3. Press <Enter>. The utility copies the current BIOS file to the floppy disk.

```
A:\>afudos /oOLDBIOS1.rom
AMI Firmware Update Utility - Version 1.19(ASUS V2.07(03.11.24BB))
Copyright (C) 2002 American Megatrends, Inc. All rights reserved.
    Reading flash ..... done
    Write to file...... ok
A:\>
```

The utility returns to the DOS prompt after copying the current BIOS file.

Updating the BIOS file

To update the BIOS file using the AFUDOS utility:

1. Visit the ASUS website (www.asus.com) and download the latest BIOS file for the motherboard. Save the BIOS file to a bootable floppy disk.

Write the BIOS filename on a piece of paper. You need to type the exact BIOS filename at the DOS prompt.

2. Copy the AFUDOS utility (afudos.exe) from the motherboard support CD to the bootable floppy disk you created earlier.
3. Boot the system in DOS mode, then at the prompt type:

   afudos /i[filename]

   where [filename] is the latest or the original BIOS file on the bootable floppy disk.

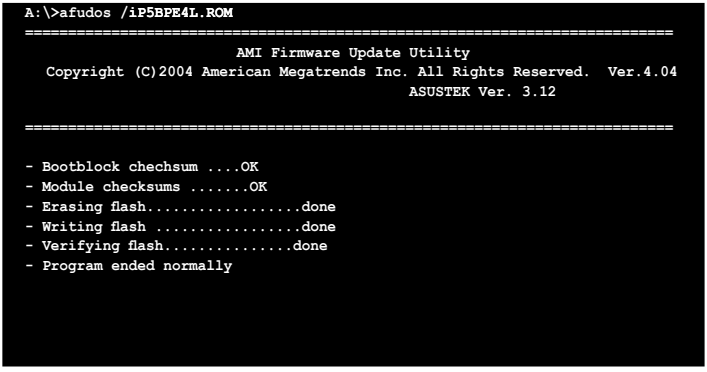
```
A:\>afudos / iP5BPE4L.ROM
```

4. The utility verifies the file and starts updating the BIOS.

```
A:\>afudos /iP5BPE4L.ROM

================================================================================
                        AMI Firmware Update Utility
  Copyright (C)2004 American Megatrends Inc. All Rights Reserved.  Ver.4.04
                             ASUSTEK Ver. 3.12

================================================================================
- Bootblock chechsum ....OK
- Module checksums .......OK
- Erasing flash..............done
- Writing flash ..............0x0008cc00 (9%)

    Writing flash ...... 0x0008CC00 (9%)
```

Do not shut down or reset the system while updating the BIOS to prevent system boot failure!

5. The utility returns to the DOS prompt after the BIOS update process is completed. Reboot the system from the hard disk drive.



5.1.3 ASUS CrashFree BIOS 3 utility

The ASUS CrashFree BIOS 3 is an auto recovery tool that allows you to restore the BIOS file when it fails or gets corrupted during the updating process. You can update a corrupted BIOS file using the USB flash disk or the floppy disk that contains the updated BIOS file.

- Prepare the USB flash disk, or the floppy disk containing the updated motherboard BIOS before using this utility.
- Ensure that you rename the original or updated BIOS file in the floppy disk or the USB flash disk to **P5BPE4L.ROM**.

Recovering the BIOS from the USB flash disk

To recover the BIOS from the USB flash disk:

1. Insert the USB flash disk that contains BIOS file to the USB port.
2. Turn on the system.
3. The utility will automatically checks the devices for the BIOS file when found, the utility reads the BIOS file and starts flashing the corrupted BIOS file.
4. Restart the system after the utility completes the updating process.

- Only the USB flash disk with FAT 32/16 format and single partition can support ASUS CrashFree BIOS 3. The device size should be smaller than 8GB.
- DO NOT shut down or reset the system while updating the BIOS! Doing so can cause system boot failure!

Recovering the BIOS from a floppy disk

To recover the BIOS from a floppy disk:

1. Turn on the system.
2. Insert the floppy disk with the original or updated BIOS file to the floppy disk drive.
3. The utility displays the following message and automatically checks the floppy disk for the original or updated BIOS file.

```
Bad BIOS checksum. Starting BIOS recovery...
Checking for floppy...
```

When found, the utility reads the BIOS file and starts flashing the corrupted BIOS file.

```
Bad BIOS checksum. Starting BIOS recovery...
Checking for floppy...
Floppy found!
Reading file "P5BPE4L.ROM". Completed.
Start flashing...
```

DO NOT shut down or reset the system while updating the BIOS! Doing so can cause system boot failure!

4. Restart the system after the utility completes the updating process.

5.2 BIOS setup program

This motherboard supports a programmable firmware chip that you can update using the provided utility described in section **5.1 Managing and updating your BIOS**.

Use the BIOS Setup program when you are installing a motherboard, reconfiguring your system, or prompted to “Run Setup”. This section explains how to configure your system using this utility.

Even if you are not prompted to use the Setup program, you can change the configuration of your computer in the future. For example, you can enable the security password feature or change the power management settings. This requires you to reconfigure your system using the BIOS Setup program so that the computer can recognize these changes and record them in the CMOS RAM of the firmware hub.

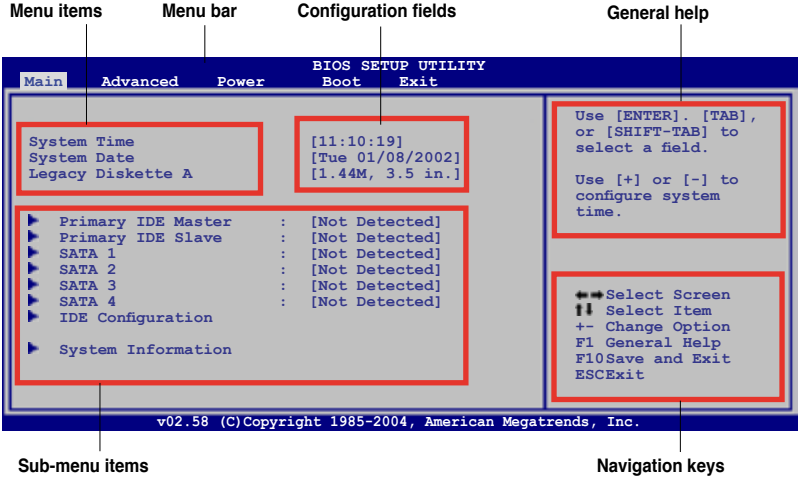
The firmware hub on the motherboard stores the Setup utility. When you start up the computer, the system provides you with the opportunity to run this program. Press <Del> during the Power-On-Self-Test (POST) to enter the Setup utility; otherwise, POST continues with its test routines.

If you wish to enter Setup after POST, restart the system by pressing <Ctrl+Alt+Delete>, or by pressing the reset button on the system chassis. You can also restart by turning the system off and then back on. Do this last option only if the first two failed.

The Setup program is designed to make it as easy to use as possible. Being a menu-driven program, it lets you scroll through the various sub-menus and make your selections from the available options using the navigation keys.

- The default BIOS settings for this motherboard apply for most conditions to ensure optimum performance. If the system becomes unstable after changing any BIOS settings, load the default settings to ensure system compatibility and stability. Select the **Load Setup Defaults** item under the Exit Menu. See section **5.7 Exit Menu**.
- The BIOS setup screens shown in this section are for reference purposes only, and may not exactly match what you see on your screen.
- Visit the ASUS website (www.asus.com) to download the latest BIOS file for this motherboard.

5.2.1 BIOS menu screen



5.2.2 Menu bar

The menu bar on top of the screen has the following main items:

Main	For changing the basic system configuration
Advanced	For changing the advanced system settings
Power	For changing the advanced power management (APM) configuration
Boot	For changing the system boot configuration
Exit	For selecting the exit options and loading default settings

To select an item on the menu bar, press the right or left arrow key on the keyboard until the desired item is highlighted.

5.2.3 Navigation keys

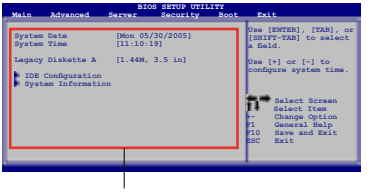
At the bottom right corner of a menu screen are the navigation keys for that particular menu. Use the navigation keys to select items in the menu and change the settings.

Some of the navigation keys differ from one screen to another.

5.2.4 Menu items

The highlighted item on the menu bar displays the specific items for that menu. For example, selecting **Main** shows the Main menu items.

The other items (Advanced, Power, Boot, and Exit) on the menu bar have their respective menu items.



Main menu items

5.2.5 Sub-menu items

A solid triangle before each item on any menu screen means that the iteam has a sub-menu. To display the sub-menu, select the item and press <Enter>.

5.2.6 Configuration fields

These fields show the values for the menu items. If an item is user-configurable, you can change the value of the field opposite the item. You cannot select an item that is not user-configurable.

A configurable field is enclosed in brackets, and is highlighted when selected. To change the value of a field, select it then press <Enter> to display a list of options. Refer to **5.2.7 Pop-up window**.

5.2.7 Pop-up window

Select a menu item then press <Enter> to display a pop-up window with the configuration options for that item.

5.2.8 Scroll bar

A scroll bar appears on the right side of a menu screen when there are items that do not fit on the screen. Press the Up/ Down arrow keys or <Page Up> /<Page Down> keys to display the other items on the screen.

Pop-up window

Scroll bar

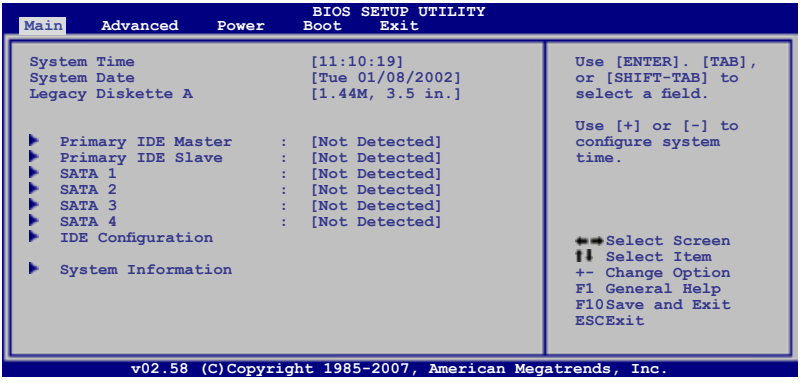
5.2.9 General help

At the top right corner of the menu screen is a brief description of the selected item.

5.3 Main menu

When you enter the BIOS Setup program, the **Main** menu screen appears, giving you an overview of the basic system information.

Refer to section **5.2.1 BIOS menu screen** for information on the menu screen items and how to navigate through them.



5.3.1 System Date [Day xx/xx/xxxx]

Allows you to set the system date.

5.3.2 System Time [xx:xx:xx]

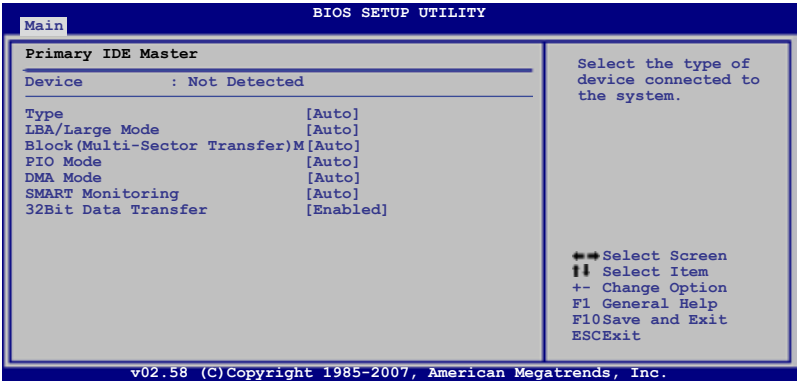
Allows you to set the system time.

5.3.3 Legacy Diskette A [1.44M, 3.5 in.]

Sets the type of floppy drive installed.
Configuration options: [Disabled] [360K, 5.25 in.] [1.2M , 5.25 in.] [720K , 3.5 in.] [1.44M, 3.5 in.] [2.88M, 3.5 in.]

5.3.4 Primary IDE Master/Slave, SATA1/2/3/4

The BIOS automatically detects the connected IDE devices. There is a separate sub-menu for each IDE device. Select a device item, then press <Enter> to display the IDE device information.



The BIOS automatically detects the values opposite the dimmed items (Device, Vendor, Size, LBA Mode, Block Mode, PIO Mode, Async DMA, Ultra DMA, and SMART monitoring). These values are not user-configurable. These items show N/A if no IDE device is installed in the system.

Type [Auto]

Selects the type of IDE drive. Setting to [Auto] allows automatic selection of the appropriate IDE device type. Select [CDROM] if you are specifically configuring a CD-ROM drive. Select [ARMD] (ATAPI Removable Media Device) if your device is either a ZIP, LS-120, or MO drive.
Configuration options: [Not Installed] [Auto] [CDROM] [ARMD]

LBA/Large Mode [Auto]

Enables or disables the LBA mode. Setting to [Auto] enables the LBA mode if the device supports this mode, and if the device was not previously formatted with LBA mode disabled.
Configuration options: [Disabled] [Auto]

Block (Multi-sector Transfer) [Auto]

Enables or disables data multi-sectors transfers. When set to [Auto], the data transfer from and to the device occurs multiple sectors at a time if the device supports multi-sector transfer feature. When set to [Disabled], the data transfer from and to the device occurs one sector at a time.
Configuration options: [Disabled] [Auto]

PIO Mode [Auto]

Selects the PIO mode.
Configuration options: [Auto] [0] [1] [2] [3] [4]

DMA Mode [Auto]

Selects the DMA mode.
Configuration options: [Auto] [SWDMA0~2] [MWDMA0~2] [UDMA0~6]

SMART Monitoring [Auto]

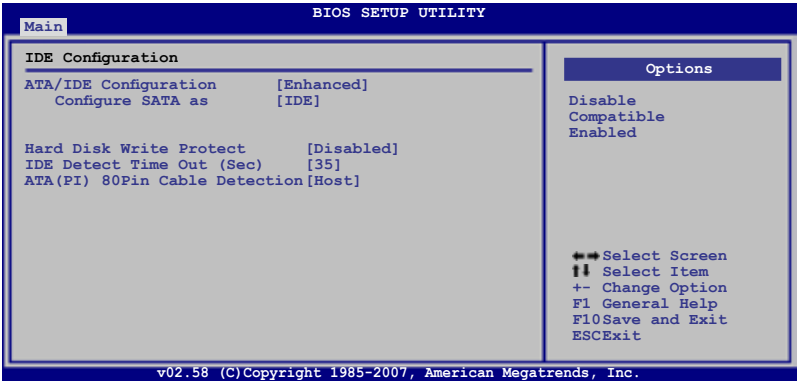
Sets the Smart Monitoring, Analysis, and Reporting Technology. Configuration options: [Auto] [Disabled] [Enabled]

32Bit Data Transfer [Enabled]

Enables or disables 32-bit data transfer.
Configuration options: [Disabled] [Enabled]

5.3.5 IDE Configuration

The items in this menu allow you to set or change the configurations for the IDE devices installed in the system. Select an item then press <Enter> if you wish to configure the item.



ATA/IDE Configuration [Enhanced]

Disables or allows selection of the IDE operation mode depending on the operating system (OS) that you installed. Set to [Enhanced Mode] if you are using native OS, such as Windows® 2000/XP/Vista. Set to [Compatible Mode] if you are using legacy OS, such as Windows® ME/98/NT and MS-DOS.
Configuration options: [Disabled] [Compatible Mode] [Enhanced Mode]

Configure SATA as [IDE]
Set the SATA configuration.
Configuration options: [IDE] [RAID] [AHCI]

Hard Disk Write Protect [Disabled]

Enables or disables the device write protection. This will be effective only if device is accessed through BIOS.
Configuration options: [Disabled] [Enabled]

IDE Detect Time Out (Sec) [35]

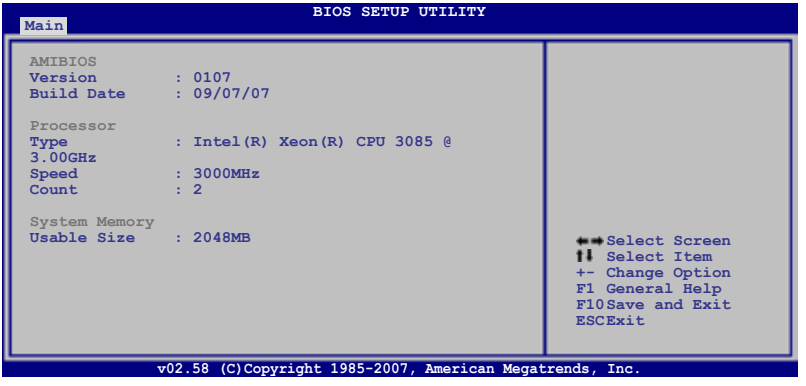
Selects the time out value for detecting ATA/ATAPI devices.
Configuration options: [0] [5] [10] [15] [20] [25] [30] [35]

ATA(PI) 80Pin Cable Detection [Host]

Selects the mechanism for detecting 80Pin ATA(PI) Cable.
Configuration options: [Host & Device] [Host] [Device]

5.3.6 System Information

This menu gives you an overview of the general system specifications. The BIOS automatically detects the items in this menu.



AMI BIOS

Displays the auto-detected BIOS information.

Processor

Displays the auto-detected CPU specification.

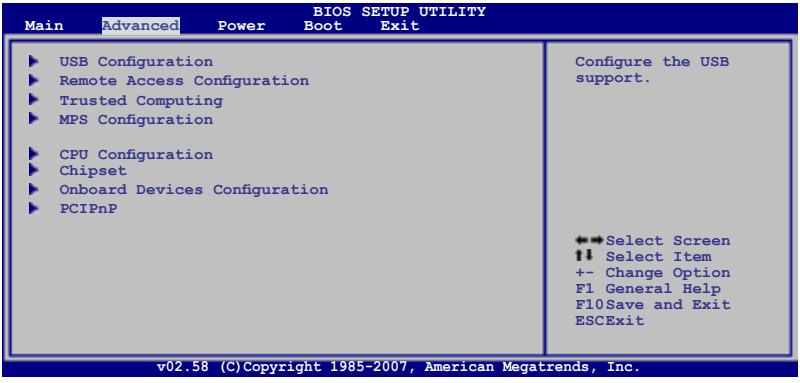
System Memory

Displays the auto-detected total system memory.

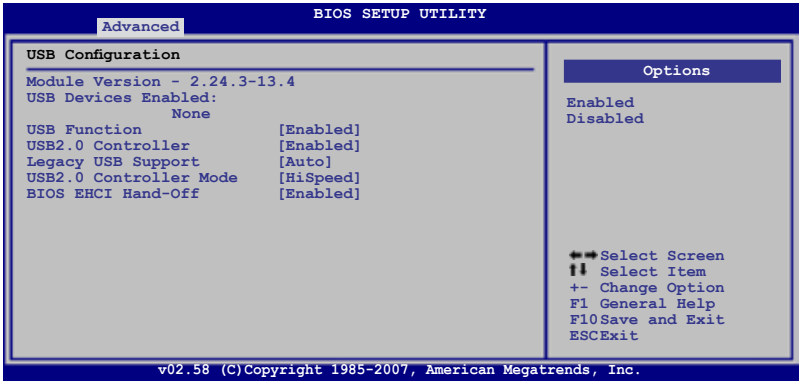
5.4 Advanced menu

The Advanced menu items allow you to change the settings for the CPU and other system devices.

Take caution when changing the settings of the Advanced menu items. Incorrect field values can cause the system to malfunction.



5.4.1 USB Configuration



USB Function [Enabled]

Allows you to enable or disable the USB function.
Configuration options: [Disabled] [Enabled]

The following items appear only when the **USB Functions** item is set to [Enabled].

USB 2.0 Controller [Enabled]

Allows you to enable or disable the USB 2.0 controller.
Configuration options: [Enabled] [Disabled]

Legacy USB Support [Auto]

Allows you to enable or disable support for legacy USB. The AUTO option disables legacy support if there is no USB device connected.
Configuration options: [Disabled] [Enabled] [Auto]

USB2.0 Controller mode [HiSpeed]

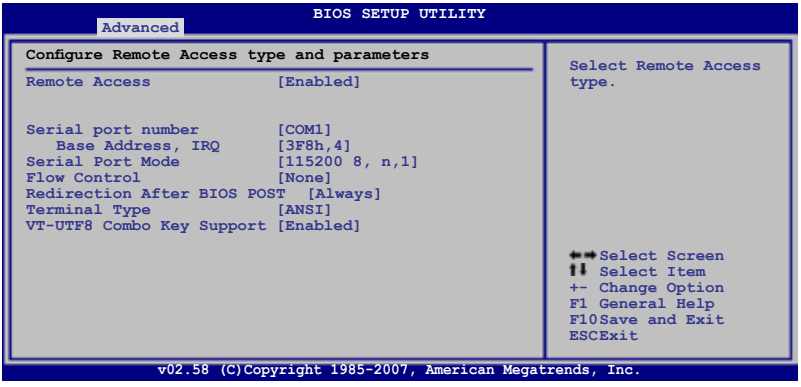
Allows you to set the USB2.0 controller mode to HiSpeed (480 Mbps) or FullSpeed (12 Mbps).
Configuration options: [HiSpeed] [FullSpeed]

BIOS EHCI Hand-Off [Enabled]

Allows yout to enable or disable the BIOS EHCI Hand-Off support function.
Configuration options: [Disabled] [Enabled]

5.4.2 Remote Access Configuration

The items in this menu allows you to configure the Remote Access features. Select an item then press <Enter> to display the configuration options.



Remote Access [Disabled]

Enables or disables the remote access feature.
Configuration options: [Disabled] [Enabled]

The following items appear only when the **Remote Access** item is set to [Enabled].

Serial port number [COM1]

Allows you to select a serial port for console redirection.
Configuration options: [COM1] [COM2]

Serial Port Mode [115200 8, n,1]

Allows you to select a serial port mode.
Configuration options: [115200 8,n,1] [57600 8,n,1] [38400 8,n,1] [19200 8,n,1] [09600 8,n,1]

Flow Control [None]

Allows you to set the flow control for console redirection.
Configuration options: [None] [Hardware] [Software]

Redirection After BIOS POST [Always]

Sets the redirection mode after the BIOS Power-On Self-Test (POST). Some operating systems may not work when this item is set to Always.
Configuration options: [Disabled] [Boot Loader] [Always]

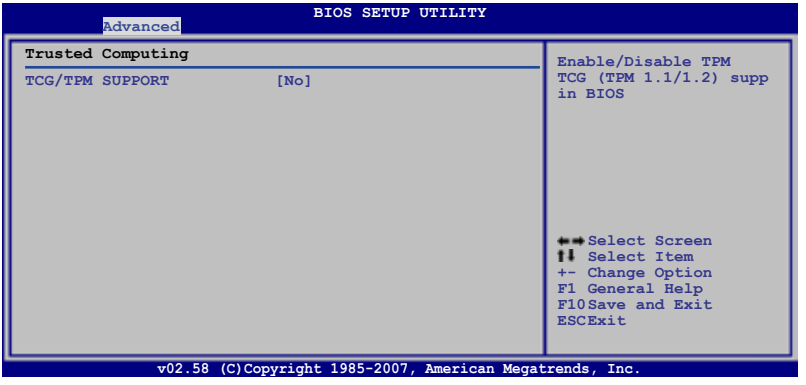
Terminal Type [ANSI]

Allows you to select the target terminal type.
Configuration options: [ANSI] [VT100] [VT-UTF8]

VT-UTF8 Combo Key Support [Enabled]

Allows you to enable or disable VT-UTF8 Combination Key Support for ANSI/ VT100 terminals. Configuration options: [Disabled] [Enabled]

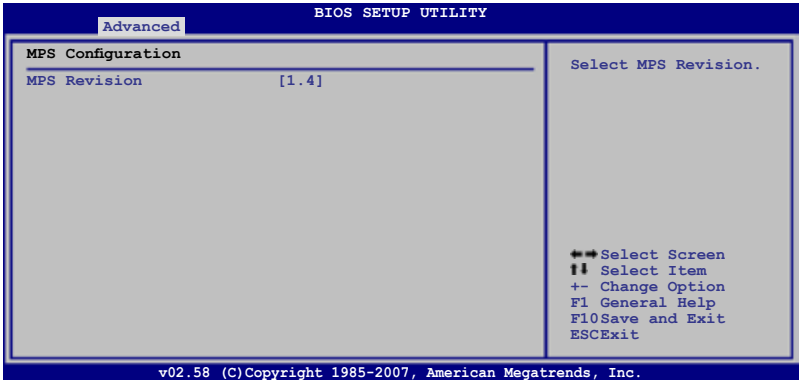
5.4.3 Trusted Computing



TCG/TPM SUPPORT [No]

Allows you to set the TCG/TPM SUPPORT. Configuration options: [No] [Yes]

5.4.4 MPS Configuration

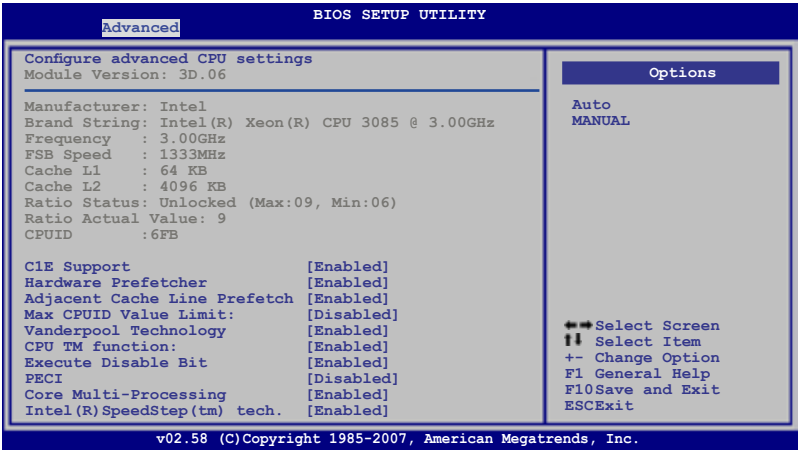


MPS Revision [1.4]

Allows you to select the MPS revision. Configuration options: [1.1] [1.4]

5.4.5 CPU Configuration

The items in this menu show the CPU-related information that the BIOS automatically detects.



C1E Support [Enabled]

Allows you to enable or disable the Enhanced Halt State.
Configuration options: [Disabled] [Enabled]

Hardware Prefetcher [Enabled]

Allows you to enable or disable the Hardware Prefetcher Function.
Configuration options: [Disabled] [Enabled]

Adjacent Cache Line Prefectch [Enabled]

Allows you to enable or disable theAdjacent Cache Line Prefetch Function.
Configuration options: [Disabled] [Enabled]

Max CPUID Value Limit [Disabled]

Enable this item to boot legacy operating systems that cannot support CPUs with extended CPUID functions. Configuration options: [Disabled] [Enabled]

Vanderpool Technology [Enabled]

The Vanderpool Technology allows a hardware platform to run multiple operating systems separately and simultaneously, enabling one system to virtually function as several systems.
Configuration options: [Disabled] [Enabled]

CPU TM function: [Enabled]

This function enables the overheated CPU to throttle the clock speed to cool down.
Configuration options: [Disabled] [Enabled]

Execute Disable Bit [Disabled]

When disabled, forces the XD feature flag to always return to 0.
Configuration options: [Disabled] [Enabled]

PECI [Disabled]

Allows you to enable or disable the PECI.
Configuration options: [Enabled] [Disabled]

Core Multi-Processing [Enabled]

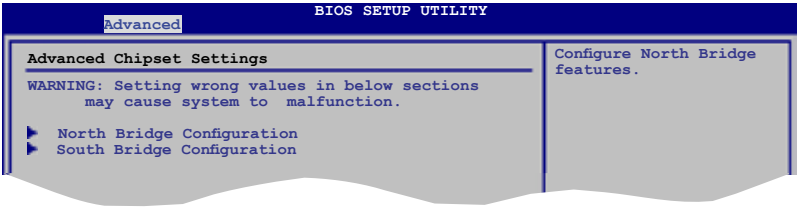
Allows you to enable or disable one exeucation core.
Configuration options: [Disabled] [Enabled]

Intel (R) SpeedStep (tm) tech. [Enabled]

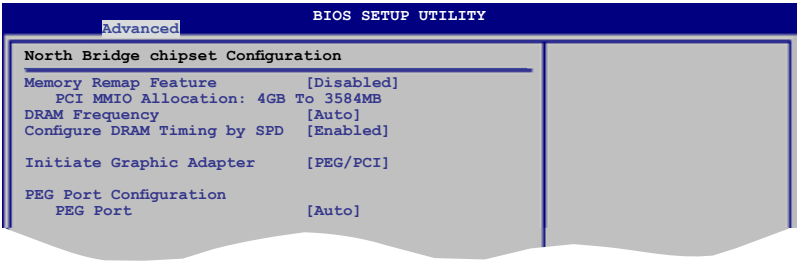
When set to [Disabled], the CPU runs at its default speed. When set to [Enabled], the CPU speed is controlled by the operating system.
Configuration options: [Enabled] [Disabled]

5.4.6 Chipset Configuration

The Chipset Configuration menu allows you to change the advanced chipset settings. Select an item then press <Enter> to display the sub-menu.



North Bridge Configuration



Memory Remap Feature [Enabled]

Allows you to enable or disable the remapping of the overlapped PCI memory above the total physical memory. Enable this option only when you install 64-bit operating system. Configuration options: [Disabled] [Enabled]

DRAM Frequency [Auto]

Allows you to set the DDR operating frequency.

Configuration options: [Auto] [667 MHz] [800 MHz]

Configure DRAM Timing by SPD [Enabled]

When this item is enabled, the DRAM timing parameters are set according to the DRAM SPD (Serial Presence Detect). When disabled, you can manually set the DRAM timing parameters through the DRAM sub-items.
Configuration options: [Enabled] [Disabled]

Initiate Graphic Adapter [PEG/PCI]

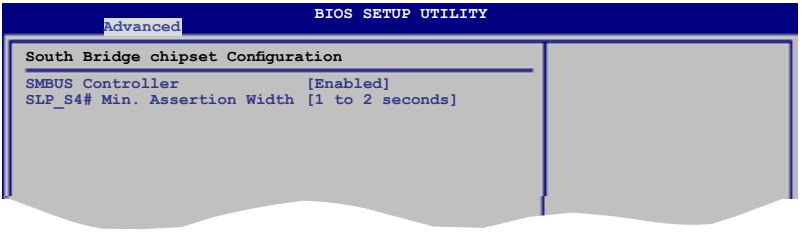
Allows you to select the graphics controller as the primary boot device.
Configuration options: [PCI/PEG] [PEG/PCI]

PEG Port Configuration

PEG Port [Auto]

Configuration options: [Auto] [Disabled]

South Bridge Configuration



SMBUS Controller [Enabled]

Allows you to enable or disable the SMBUS Controller.
Configuration options: [Enabled] [Disabled]

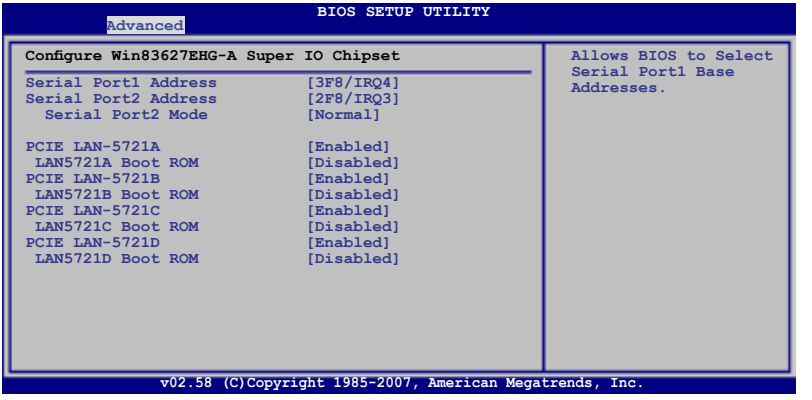
SLP_S4# Min. Assertion Width [1 to 2 seconds]

Allows you to select the SLP_S4# Min. Assertion Width.

Configuration options: [4 to 5 seconds] [3 to 4 seconds] [2 to 3 seconds] [1 to 2 seconds]

5.4.7 Onboard Devices Configuration

The Onboard Devices Configuration menu allows you to change the onboard devices settings. Select an item then press <Enter> to display the sub-menu.



Serial Port1 Address [3F8/IRQ4]

Allows you to select the Serial Port1 base address.
Configuration options: [Disabled] [3F8/IRQ4] [3E8/IRQ4]

Serial Port2 Address [2F8/IRQ3]

Allows you to select the Serial Port2 base address.
Configuration options: [Disabled] [2F8/IRQ3] [2E8/IRQ3]

PCIE LAN-5721A / B / C / D [Enabled]

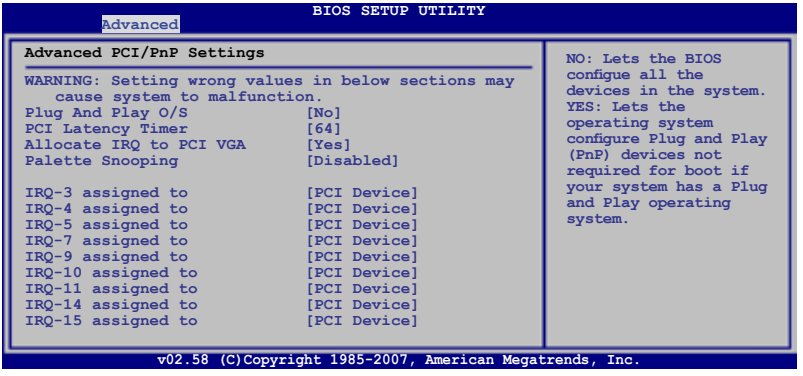
Allows you to hide or active PCIE LAN-5721A, B, C, or D.
Configuration options: [Disabled] [Enabled]

LAN5721A / B / C / D Boot ROM [Disabled]
Allows you to Configure LAN5721A, LAN5721B, LAN5721C or LAN5721D Boot ROM.
Configuration options: [Disabled] [Enabled]

5.4.8 PCI PnP

The PCI PnP menu items allow you to change the advanced settings for PCI/PnP devices. The menu includes setting IRQ and DMA channel resources for either PCI/PnP or legacy ISA devices, and setting the memory size block for legacy ISA devices.

Take caution when changing the settings of the PCI PnP menu items. Incorrect field values can cause the system to malfunction.



Plug And Play O/S [No]

When set to [No], BIOS configures all the devices in the system. When set to [Yes] and if you install a Plug and Play operating system, the operating system configures the Plug and Play devices not required for boot. Configuration options: [No] [Yes]

PCI Latency Timer [64]

Allows you to select the value in units of PCI clocks for the PCI device latency timer register. Configuration options: [32] [64] [96] [128] [160] [192] [224] [248]

Allocate IRQ to PCI VGA [Yes]

When set to [Yes], BIOS assigns an IRQ to PCI VGA card if the card requests for an IRQ. When set to [No], BIOS does not assign an IRQ to the PCI VGA card even if requested. Configuration options: [Yes] [No]

Palette Snooping [Disabled]

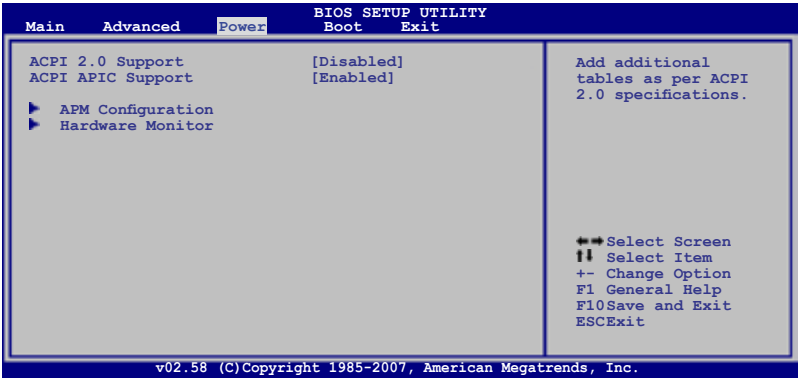
When set to [Enabled], the pallete snooping feature informs the PCI devices that an ISA graphics device is installed in the system so that the latter can function correctly. Configuration options: [Disabled] [Enabled]

IRQ-xx assigned to [PCI Device]

When set to [PCI Device], the specific IRQ is free for use of PCI/PnP devices. When set to [Reserved], the IRQ is reserved for legacy ISA devices. Configuration options: [PCI Device] [Reserved]

5.5 Power Configuration

The Power Configuration menu items allow you to change the settings for the ACPI and Advanced Power Management (APM) features. Select an item then press <Enter> to display the configuration options.



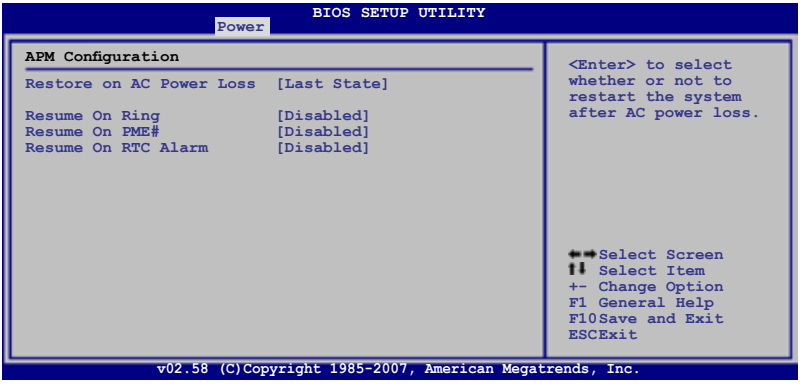
ACPI 2.0 Support [Disabled]

Allows you to enable or disable the Advanced Configuration and Power Interface (ACPI) 2.0 Support. Configuration options: [Disabled] [Enabled]

ACPI APIC Support [Enabled]

Allows you to enable or disable the Advanced Configuration and Power Interface (ACPI) support in the Advanced Programmable Interrupt Controller (APIC). When set to Enabled, the ACPI APIC table pointer is included in the RSDT pointer list. Configuration options: [Disabled] [Enabled]

5.5.1 APM Configuration



Restore on AC Power Loss [Last State]

When set to Power Off, the system goes into off state after an AC power loss. When set to Power On, the system goes on after an AC power loss. When set to Last State, the system goes into either off or on state, whatever the system state was before the AC power loss.
Configuration options: [Power Off] [Power On] [Last State]

Resume On Ring [Disabled]

When set to [Enabled], the system enables the RI to generate a wake event while the computer is in Soft-off mode.
Configuration options: [Disabled] [Enabled]

Resume On PME# [Disabled]

Allows you to enable or disable the Resume On PME# function.
Configuration options: [Disabled] [Enabled]

Resume On RTC Alarm [Disabled]

Allows you to enable or disable RTC to generate a wake event. When this item is set to [Enabled], the items RTC Alarm Date, RTC Alarm Hour, RTC Alarm Minute, and RTC Alarm Second appear with set values.
Configuration options: [Disabled] [Enabled]

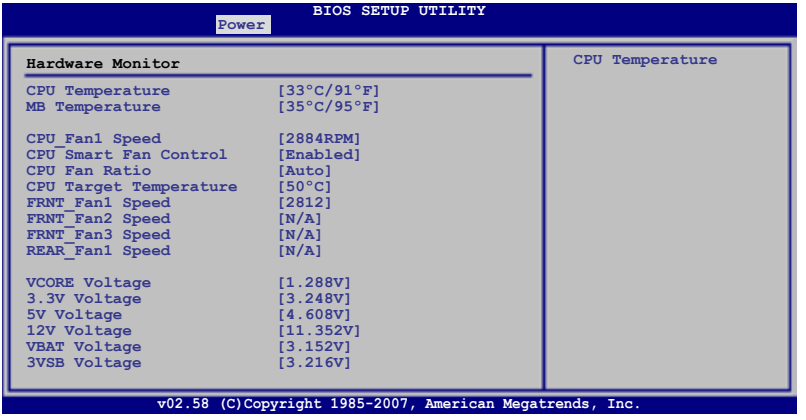
The following items appear only when the **Resume On By RTC Alarm** item is set to Enabled.

RTC Alarm Date [15]
To set the alarm date, highlight this item and press the <+> or <-> key to make the selection. Configuration options: [Everyday] [1] [2] [3]...[31]

RTC Alarm Hour [12]
To set the alarm hour, highlight this item and press the <+> or <-> key to make the selection. Configuration options: [00] [01] [02] [03]...[23]

RTC Alarm Minute (Second) [30]
To set the alarm minute (second≠), highlight this item and press the <+> or <-> key to make the selection. Configuration options: [00] [01] [02] [03]...[59]

5.5.2 Hardware Monitor



CPU Temperature [xxxºC/xxxºF]
MB Temperature [xxxºC/xxxºF]

The onboard hardware monitor automatically detects and displays the motherboard and CPU temperatures. Select [Ignored] if you do not wish to display the detected temperatures.

CPU_Fan1 Speed [xxxxRPM] or [N/A]
FRNT_Fan1/2/3 Speed [xxxxRPM] or [N/A]
REAR_Fan1 Speed [xxxxRPM] or [N/A]

The onboard hardware monitor automatically detects and displays the CPU, front, and rear fan speed in rotations per minute (RPM). If the fan is not connected to the motherboard, the field shows N/A.

CPU Smart Fan Control [Enabled]

Allows you to enable or disable the ASUS Smart Fan feature that smartly adjusts the fan speeds for more efficient system operation.
Configuration options: [Disabled] [Enabled]

The **CPU Fan Ratio** and **CPU Target Temperature** items appear only when you set the **CPU Smart Fan Control** item to [Enabled].

CPU Fan Ratio [XXX]
CPU Target Temperature [XXX]

Displays the detected CPU and system threshold temperature when the Smart Fan Control is enabled.

Front_Fan1/2/3 Fan Speed [xxxxRPM] or [N/A] or [Ignored]
Rear_Fan1 Speed [xxxxRPM] or [N/A] or [Ignored]

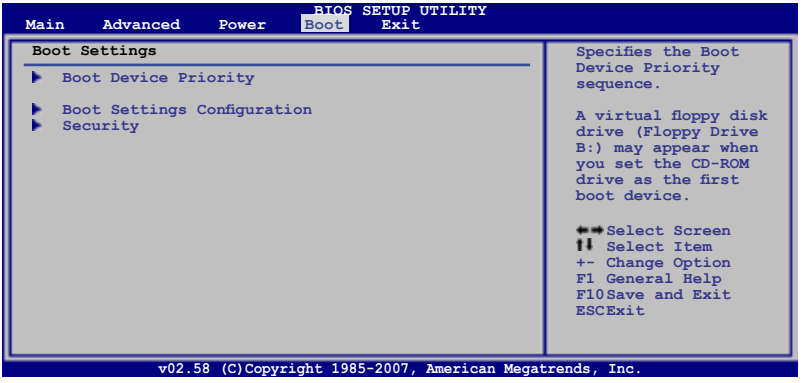
The onboard hardware monitor automatically detects and displays the chassis fan speed in rotations per minute (RPM). If the fan is not connected to the chassis, the specific field shows N/A. Select [Ignored] if you do not wish to display the detected speed.

VCORE Voltage, 3.3V Voltage, 5V Voltage, 12V Voltage, VBAT Voltage, and 3VSB Voltage

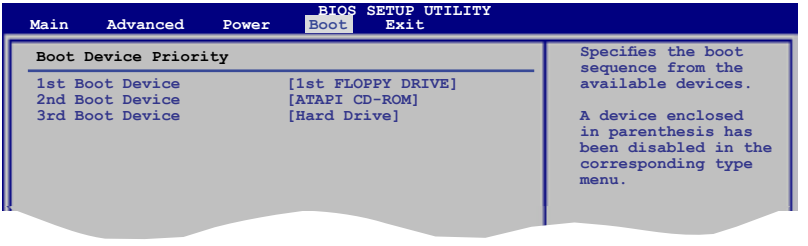
The onboard hardware monitor automatically detects the voltage outputs through the onboard voltage regulators.

5.6 Boot menu

The Boot menu items allow you to change the system boot options. Select an item then press <Enter> to display the sub-menu.



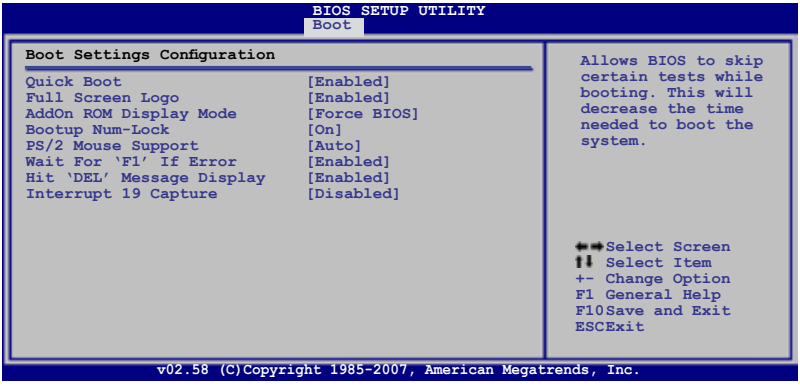
5.6.1 Boot Device Priority



1st Boot Device [1st FLOPPY DRIVE]
2nd Boot Device [ATAPI CD-ROM]
3rd Boot Device [Hard Drive]

These items specify the boot device priority sequence from the available devices. Configuration options: [xxxxx Drive] [ATAPI CD-ROM] [Hard Drive] [Disabled]

5.6.2 Boot Settings Configuration



Quick Boot [Enabled]

Enabling this item allows the BIOS to skip some power on self tests (POST) while booting to decrease the time needed to boot the system. When set to [Disabled], BIOS performs all the POST items.
Configuration options: [Disabled] [Enabled]

Full Screen Logo [Enabled]

Allows you to enable or disable the full screen logo display feature.
Configuration options: [Disabled] [Enabled]

Set this item to [Enabled] to use the ASUS MyLogo2™ feature.

AddOn ROM Display Mode [Force BIOS]

Allows you to set display mode for optional ROM. Configuration options: [Force BIOS] [Keep Current]

Bootup Num-Lock [On]

Allows you to select the power-on state for the NumLock.
Configuration options: [Off] [On]

PS/2 Mouse Support [Auto]

Allows you to enable or disable support for PS/2 mouse.
Configuration options: [Disabled] [Enabled] [Auto]

Wait for ‘F1’ If Error [Enabled]

When set to Enabled, the system waits for the F1 key to be pressed when error occurs. Configuration options: [Disabled] [Enabled]

Hit ‘DEL’ Message Display [Enabled]

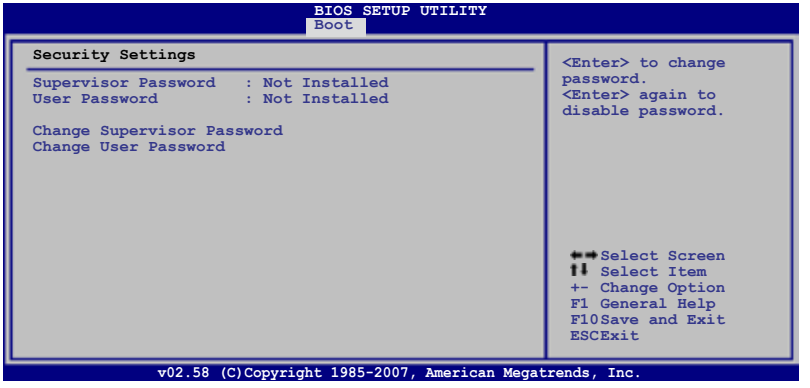
When set to Enabled, the system displays the message “Press DEL to run Setup” during POST. Configuration options: [Disabled] [Enabled]

Interrupt 19 Capture [Disabled]

When set to [Enabled], this function allows the option ROMs to trap Interrupt 19. Configuration options: [Disabled] [Enabled]

5.6.3 Security

The Security menu items allow you to change the system security settings. Select an item then press <Enter> to display the configuration options.



Change Supervisor Password

Select this item to set or change the supervisor password. The Supervisor Password item on top of the screen shows the default **Not Installed**. After you set a password, this item shows **Installed**.

To set a Supervisor Password:

1. Select the **Change Supervisor Password** item, then press <Enter>.
2. From the password box, type a password composed of at least six letters and/or numbers, then press <Enter>.
3. Confirm the password when prompted.

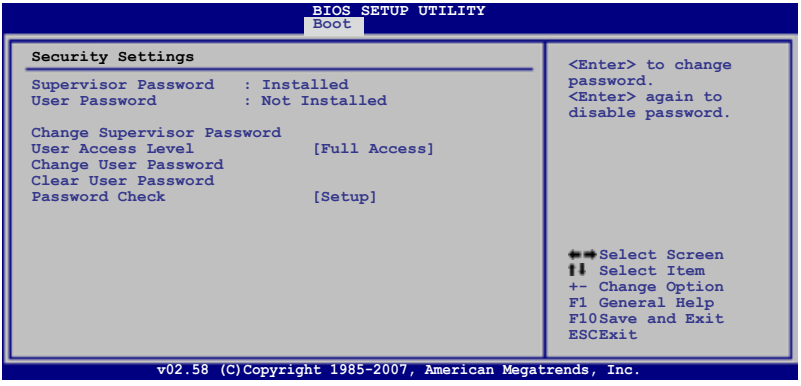
The message “Password Installed” appears after you successfully set your password.

To change the supervisor password, follow the same steps as in setting a user password.

To clear the supervisor password, select the **Change Supervisor Password** then press <Enter>. The message “Password Uninstalled” appears.

If you forget your BIOS password, you can clear clear it by erasing the CMOS Real Time Clock (RTC) RAM. See section **4.2 Jumpers** for information on how to erase the RTC RAM.

After you have set a supervisor password, the other items appear to allow you to change other security settings.



User Access Level [Full Access]

This item allows you to select the access restriction to the Setup items. Configuration options: [No Access] [View Only] [Limited] [Full Access]

No Access prevents user access to the Setup utility.

View Only allows access but does not allow change to any field.

Limited allows changes only to selected fields, such as Date and Time.

Full Access allows viewing and changing all the fields in the Setup utility.

Change User Password

Select this item to set or change the user password. The User Password item on top of the screen shows the default **Not Installed**. After you set a password, this item shows **Installed**.

To set a User Password:

1. Select the **Change User Password** item and press <Enter>.

2. On the password box that appears, type a password composed of at least six letters and/or numbers, then press <Enter>.
3. Confirm the password when prompted.

The message “Password Installed” appears after you set your password successfully.

To change the user password, follow the same steps as in setting a user password.

Clear User Password

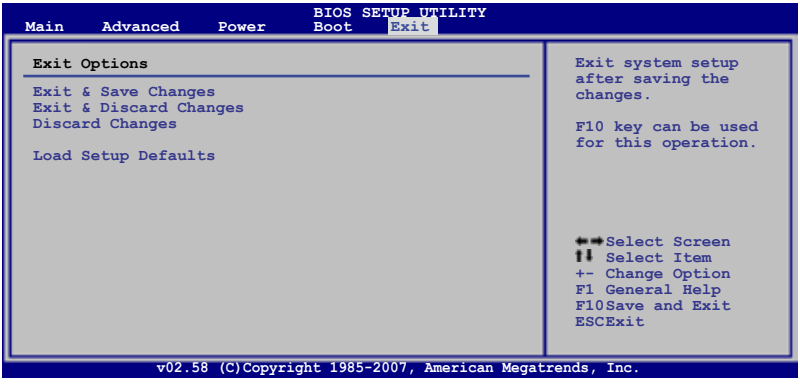
Select this item to clear the user password.

Password Check [Setup]

When set to [Setup], BIOS checks for user password when accessing the Setup utility. When set to [Always], BIOS checks for user password both when accessing Setup and booting the system.
Configuration options: [Setup] [Always]

5.7 Exit menu

The Exit menu items allow you to load the optimal or failsafe default values for the BIOS items, and save or discard your changes to the BIOS items.



Pressing <Esc> does not immediately exit this menu. Select one of the options from this menu or <F10> from the legend bar to exit.

Exit & Save Changes

Once you are finished making your selections, choose this option from the Exit menu to ensure the values you selected are saved to the CMOS RAM. An onboard backup battery sustains the CMOS RAM so it stays on even when the PC is turned off. When you select this option, a confirmation window appears. Select YES to save changes and exit.

If you attempt to exit the Setup program without saving your changes, the program prompts you with a message asking if you want to save your changes before exiting. Press <Enter> to save the changes while exiting.

Exit & Discard Changes

Select this option only if you do not want to save the changes that you made to the Setup program. If you made changes to fields other than System Date, System Time, and Password, the BIOS asks for a confirmation before exiting.

Discard Changes

This option allows you to discard the selections you made and restore the previously saved values. After selecting this option, a confirmation appears. Select YES to discard any changes and load the previously saved values.

Load Setup Defaults

This option allows you to load the default values for each of the parameters on the Setup menus. When you select this option or if you press <F5>, a confirmation window appears. Select YES to load default values. Select Exit & Save Changes or make other changes before saving the values to the non-volatile RAM.

Chapter 6

This chapter provides information on how to configure your hard disk drives as RAID sets.

RAID configuration

6.1 Setting up RAID

For PA4 model, the Intel® ICH7R Southbridge chip comes with the LSI Logic Embedded SATA RAID Utility and the Intel® Matrix Storage Manager. These utilities support SATA hard disk drives and allow creation of RAID 0, RAID 1, RAID 5, and RAID 10 configuration. For PX4 model, the ASUS SASsaby 1064E SAS RAID controller card provides RAID 0, RAID 1, and RAID 1E configuration.

6.1.1 RAID definitions

RAID 0 *(Data striping)* optimizes two identical hard disk drives to read and write data in parallel, interleaved stacks. Two hard disks perform the same work as a single drive but at a sustained data transfer rate, double that of a single disk alone, thus improving data access and storage. Use of two new identical hard disk drives is required for this setup.

RAID 1 *(Data mirroring)* copies and maintains an identical image of data from one drive to a second drive. If one drive fails, the disk array management software directs all applications to the surviving drive as it contains a complete copy of the data in the other drive. This RAID configuration provides data protection and increases fault tolerance to the entire system. Use two new drives or use an existing drive and a new drive for this setup. The new drive must be of the same size or larger than the existing drive.

RAID 1E *(Enhanced RAID 1)* has a striped layout with each stripe unit having a secondary (or alternate) copy stored on a different disk. You can use three or more hard disk drives for this configuration.

RAID 5 stripes both data and parity information across three or more hard disk drives. Among the advantages of RAID 5 configuration include better HDD performance, fault tolerance, and higher storage capacity. The RAID 5 configuration is best suited for transaction processing, relational database applications, enterprise resource planning, and other business systems. Use a minimum of three identical hard disk drives for this setup.

RAID 10 is a striped configuration with RAID 1 segments whose segments are RAID 1 arrays. This configuration has the same fault tolerance as RAID 1, and has the same overhead for fault-tolerance as mirroring alone. RAID 10 achieves high input/output rates by striping RAID 1 segments. In some instances, a RAID 10 configuration can sustain multiple simultaneous drive failure. A minimum of four hard disk drives is required for this setup.

Intel® Matrix Storage. The Intel® Matrix Storage technology supported by the ICHR chip allows you to create a RAID 0 and RAID 1 set using only two identical hard disk drives. The Intel® Matrix Storage technology creates two partitions on each hard disk drive to create a virtual RAID 0 and RAID 1 sets. This technology also allows you to change the hard disk drive partition size without losing any data.

If you want to boot the system from a hard disk drive included in a created RAID set, copy first the RAID driver from the support CD to a floppy disk before you install an operating system to the selected hard disk drive.

6.1.2 Installing hard disk drives

The system supports four hot-swap Serial ATA/SAS hard disk drives for RAID configuration.

By default, the SATA/SAS hard disk drives are connected to the motherboard SATA port 1-4 (PA4 model) or SAS port 1-4 (PX4 model) via the SATA/SAS backplane and SATA/SAS cables.

Refer to sections **1.5 Internal features** and **2.7 Hard disk drives** for details on SATA/SAS hard disk drive connection and installation.

For optimal performance, install identical drives of the same model and capacity when creating a disk array.

6.1.3 Setting the RAID item in BIOS (For PA4 model only)

You must set the RAID item in the BIOS Setup before you can create a RAID set from SATA hard disk drives attached to the SATA connectors supported by the Intel® ICH7R Southbridge chip. To do this:

1. Enter the BIOS Setup during POST.
2. Go to the **Main** menu, select **IDE Configuration**, then press <Enter>.
3. Set the **ATA/IDE Configuration** item to [Enhanced Mode], then press <Enter>.
4. Set the **Configure SATA As** item to [RAID].
5. Save your changes, then exit the BIOS Setup.

Refer to Chapter 5 for details on entering and navigating through the BIOS Setup.

6.1.4 RAID configuration utility (For PA4 model only)

Depending on the RAID_SEL1 jumper setting and the operating system, you can select a utility to create a RAID set. Refer to section **4.2 Jumpers** for details on the RAID_SEL1 jumper settings.

Use the **LSI Logic Embedded SATA RAID Setup Utility** to create a RAID 0, RAID 1 and RAID 10 under Windows® Server or Red Hat® Enterprise operating system.

Use the **Intel® Matrix Storage Manager** to create a RAID 0, RAID 1, RAID 5 and RAID 10 under Windows® Server.

Refer to the succeeding sections for details on how to use the RAID configuration utilities.

6.2 LSI Software RAID Configuration Utility (For PA4 model Only)

The LSI Logic Embedded SATA RAID Setup Utility allows you to create RAID 0, RAID 1, or RAID 10 set(s) from SATA hard disk drives connected to the SATA connectors supported by the motherboard Southbridge chip.

To enter the LSI Logic Embedded SATA RAID Setup Utility:

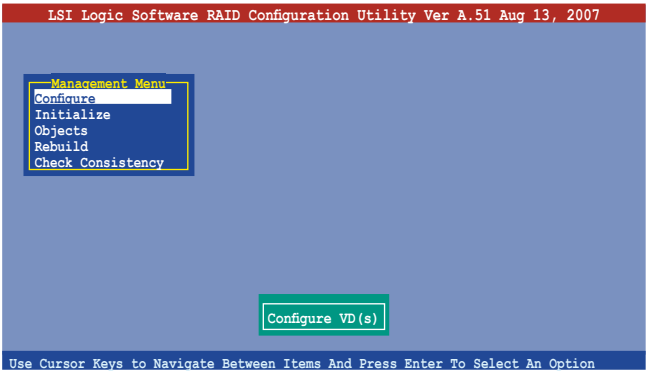
1. Turn on the system after installing all the SATA hard disk drives.
2. During POST, the LSI Logic Embedded SATA RAID Setup Utility automatically detects the installed SATA hard disk drives and displays any existing RAID set(s). Press <Ctrl> + <M> to enter the utility.

```
LSI MegaRAID Software RAID BIOS Version A.01 08131852R
LSI SATA RAID Found at PCI Bus No: Dev No:1F
Device present at Port 0     HDS722512VLSA80  117800MB
Device present at Port 1     HDS722512VLSA80  117800MB

Press Ctrl-M or Enter to run LSI Software RAID Setup Utility.
```

- The LSI Software RAID Configuration Utitlity auto configures to RAID 1 when the SATA to RAID Mode is enabled.
- The RAID setup screens shown in this section are for reference only and may not exactly match the items on your screen due to the controller version difference.
- When you create RAID sets with the LSI Software RAID configuration utility, the boot priority of the SATA optical drive has to be manually adjusted. Otherwise, the system will not boot from the connected SATA ODD.

3. The utility main window appears. Use the arrow keys to select an option from the **Management Menu**, then press <Enter>. Refer to the Management Menu descriptions on the next page.

   At the bottom of the screen is the legend box. The keys on the legend box allow you to navigate through the setup menu options or execute commands. The keys on the legend box vary according to the menu level.



Menu	Description
Configure	Allows you to create RAID 0 or RAID 1 set using the Easy Configuration or the New Configuration command. This menu also allows you to view, add, or clear RAID configurations or select the boot drive
Initialize	Allows you to initialize the logical drives of a created RAID set
Objects	Allows you to initialize logical drives or change the logical drive parameters
Rebuild	Allows you to rebuild failed drives
Check Consistency	Allows you to check the data consistency of the logical drives of a created RAID set

6.2.1 Creating a RAID 0 or RAID 1 set

The LSI Logic Embedded SATA RAID Setup Utility allows you to create a RAID 0 or RAID 1 set using two types of configurations: **Easy** and **New**.

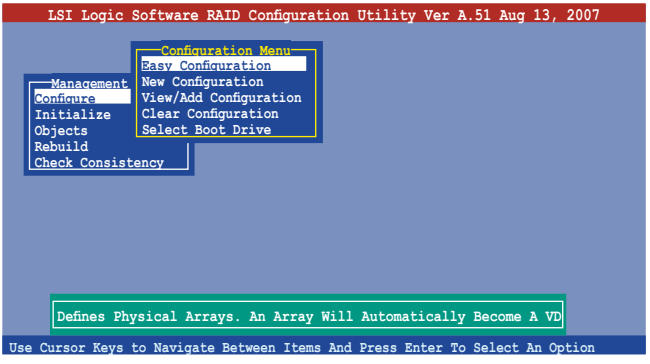
In **Easy Configuration**, the logical drive parameters are set automatically including the size and stripe size (RAID 1 only).

In **New Configuration**, you manually set the logical drive parameters and assign the set size and stripe size (RAID 1 only).

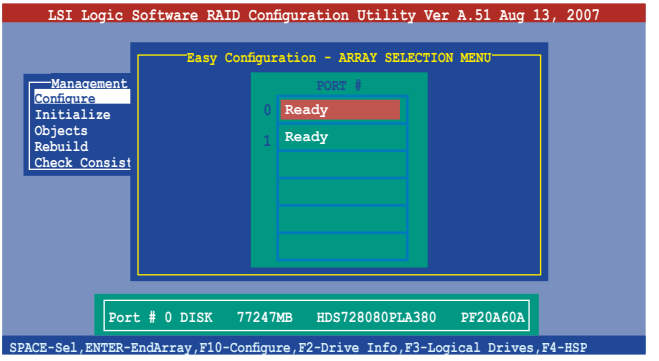
Using Easy Configuration

To create a RAID set using the **Easy Configuration** option:

1. From the utility main menu, highlight **Configure**, then press <Enter>.
2. Use the arrow keys to select **Easy Configuration**, then press <Enter>.

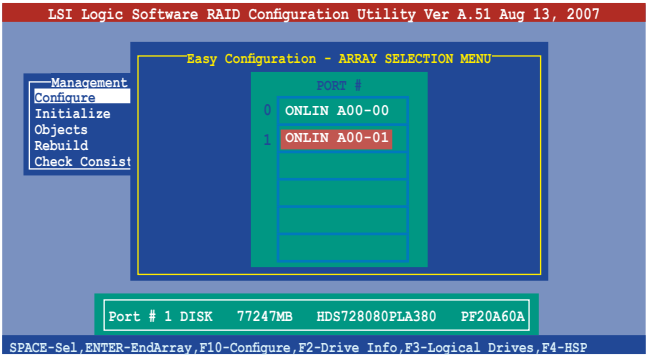


3. The **ARRAY SELECTION MENU** displays the available drives connected to the SATA ports. Select the drives you want to include in the RAID set, then press <SpaceBar>. When selected, the drive indicator changes from **READY** to **ONLIN A[X]-[Y]**, where X is the array number, and Y is the drive number.

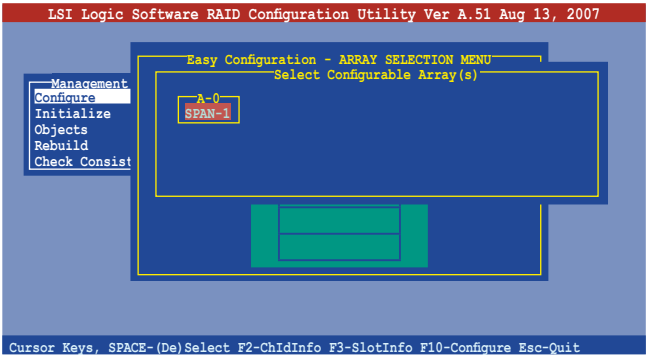


The information of the selected hard disk drive displays at the bottom of the screen.

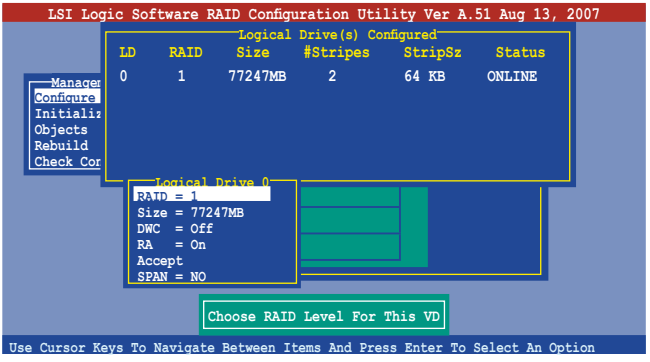
4. Select all the drives required for the RAID set, then press <Enter>. The configurable array appears on screen.



5. Press <F10>, select the configurable array, then press <SpaceBar>.

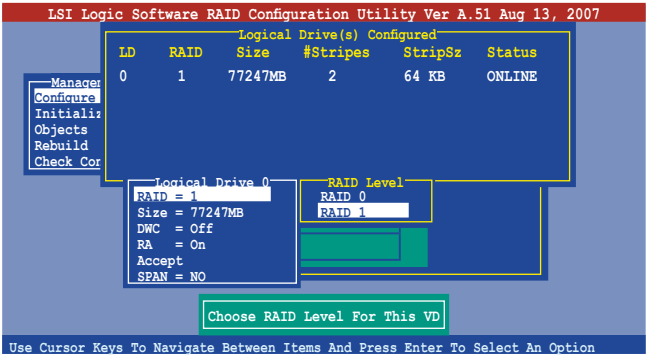


Press <F10> again, the logical drive information appears including a Logical Drive menu that allows you to change the logical drive parameters.



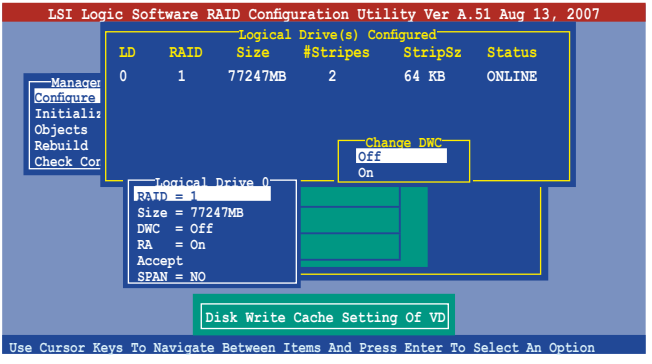
6. Select **RAID** from the **Logical Drive** menu, then press <Enter>.
7. Select the RAID level from the menu, then press <Enter>.

You need at least two identical hard disk drives when creating a RAID 1 set.



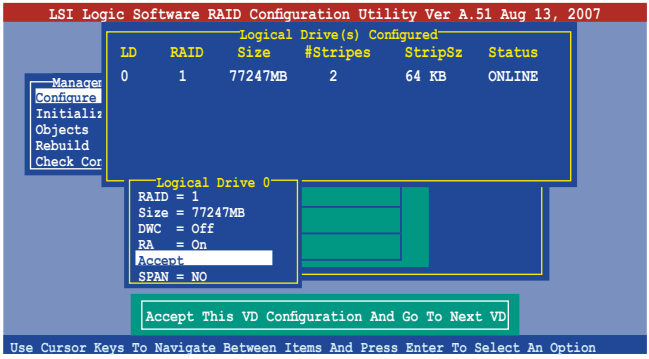
8. When creating a **RAID 1** set, select **DWC** from the **Logical Drive** menu, then press <Enter>.

   When creating a **RAID 0** set, proceed to step 10.
9. Select On to enable the Disk Write Cache setting, then press <Enter>.

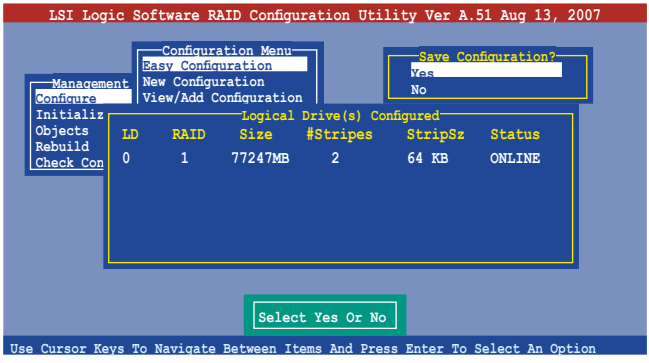


Enabling DWC can improve the performance, but with the risk of data loss.

10. When finished setting the selected logical drive configuration, select **Accept** from the menu, then press <Enter>.



11. When finished setting the selected logical drive configuration, select **Accept** from the menu, then press <Enter>.
12. Follow steps 5 to 10 to configure additional logical drives.
13. When prompted, save the configuration, then press <Esc> to return to the **Management** Menu.

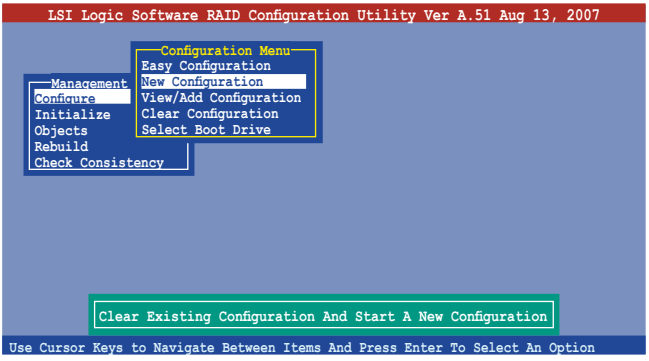


Using New Configuration

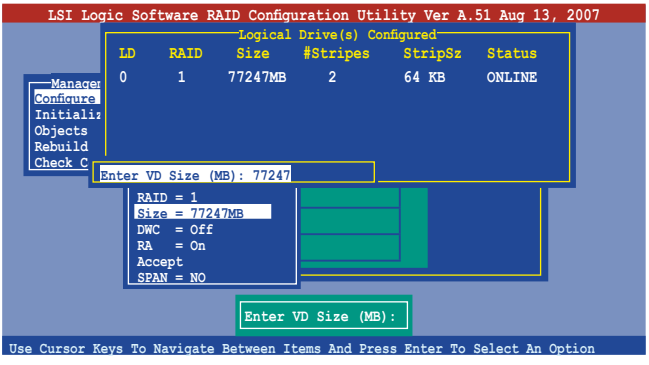
When a RAID set is already existing, using the **New Configuration** command erases the existing RAID configuration data. If you do not want to delete the existing RAID set, use the **View/Add Configuration** command to view or create another RAID configuration.

To create a RAID set using the **New Configuration** option:

1. From the utility main menu, highlight **Configure**, then press <Enter>.
2. Use the arrow keys to select **New Configuration**, then press <Enter>.



3. Follow steps 3 to 7 of the previous section.
4. Select **Size** from the **Logical Drive** menu, then press <Enter>.
5. Key-in the desired logical drive size, then press <Enter>.



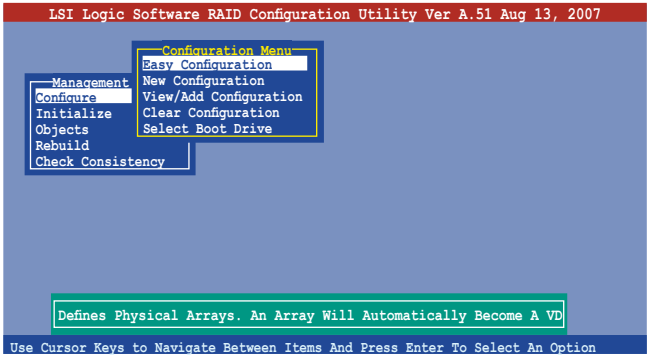
6. Follow steps 8 to 13 of the previous section to create the RAID set.

6.2.2 Creating a RAID 10 set

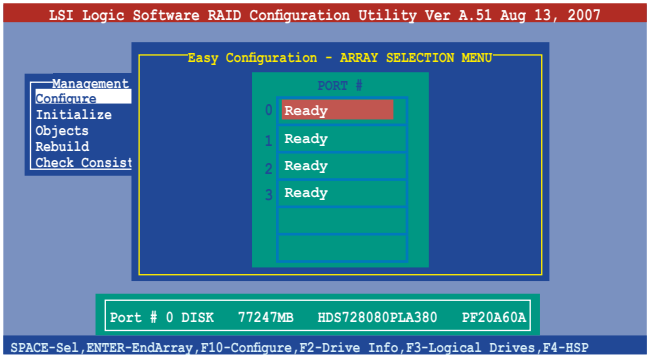
You can create a RAID 10 set using four identical hard disk drives.

To create a RAID 10 set using the Easy Configuration option:

1. From the utility main menu, highlight Configure, then press <Enter>.
2. Use the arrow keys to select Easy Configuration, then press <Enter>.

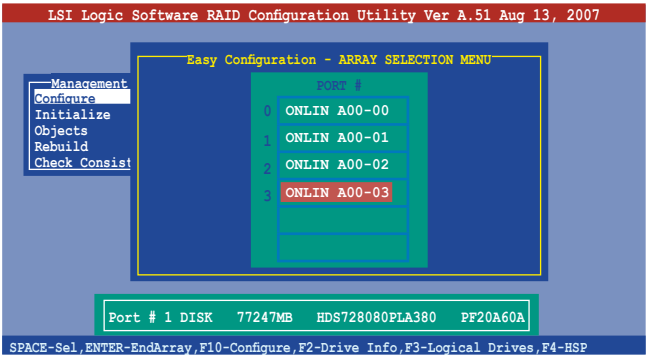


3. The **ARRAY SELECTION MENU** displays the available drives connected to the SATA ports. Select the drive(s) you want to include in the RAID set, then press <SpaceBar>. When selected, the drive indicator changes from **READY** to **ONLIN A[X]-[Y]**, where X is the array number, and Y is the drive number.

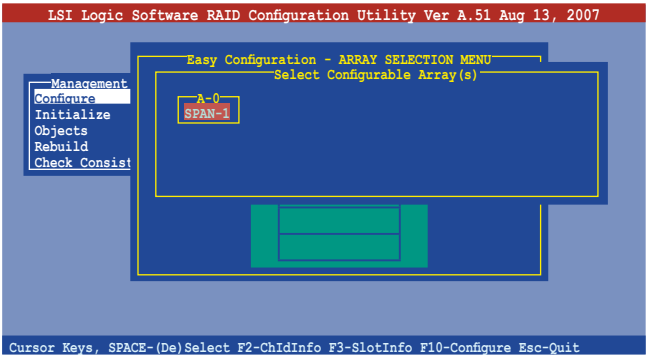


The information of the selected hard disk drive displays at the bottom of the screen.

4. Select all the drives required for the RAID 10 set, then press <Enter>. The configurable array appears on screen.



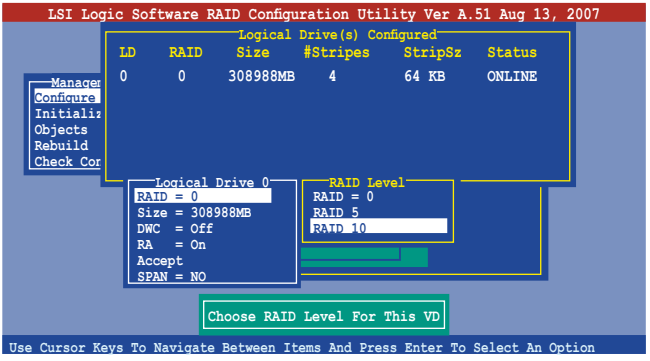
5. Press <F10>, select the configurable array, then press <SpaceBar>.



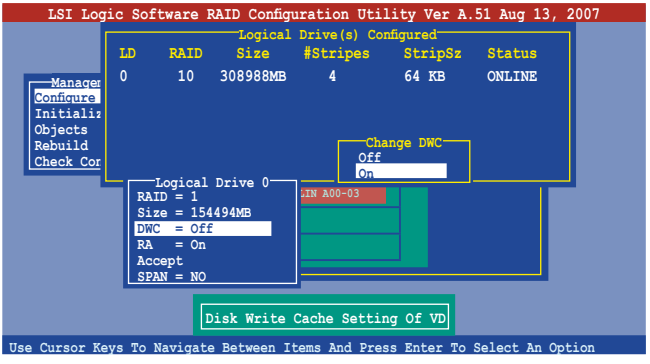
Press <F10> again, the logical drive information appears including a **Logical Drive** menu that allows you to change the logical drive parameters.

6. Select **RAID** from the **Logical Drive** menu, then press <Enter>.
7. Select **RAID 10** from the menu, then press <Enter>.

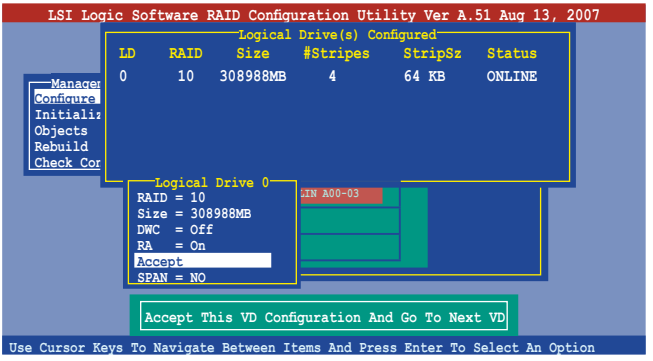
You need at least four identical hard disk drives when creating a RAID 10 set.



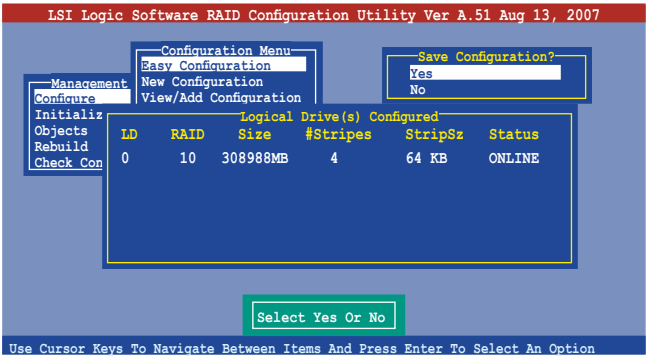
8. Select **DWC** from the **Logical Drive** menu, then press <Enter>.
9. Select **On** to enable the **Disk Write Cache** setting, then press <Enter>.



10. When finished setting the selected logical drive configuration, select **Accept** from the menu, then press <Enter>.



11. When prompted, save the configuration, then press <Esc> to return to the **Management Menu**.



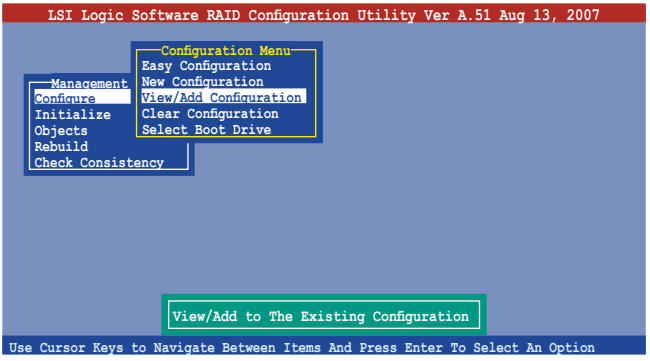
6.2.3 Adding or viewing a RAID configuration

You can add a new RAID configuration or view an existing configuration using the **View/Add Configuration** command.

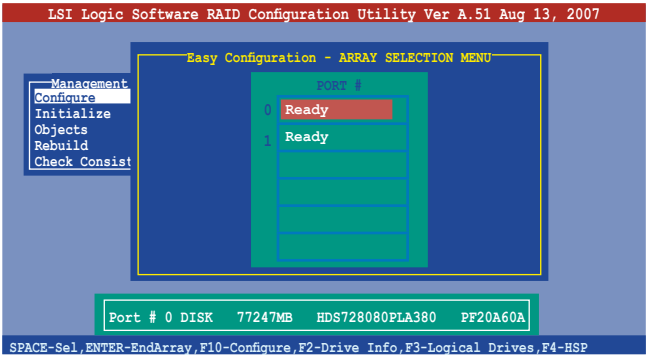
Adding a new RAID configuration

To add a new RAID configuration:

1. From the **Management Menu**, highlight **Configure**, then press <Enter>.
2. Use the arrow keys to select **View/Add Configuration**, then press <Enter>.

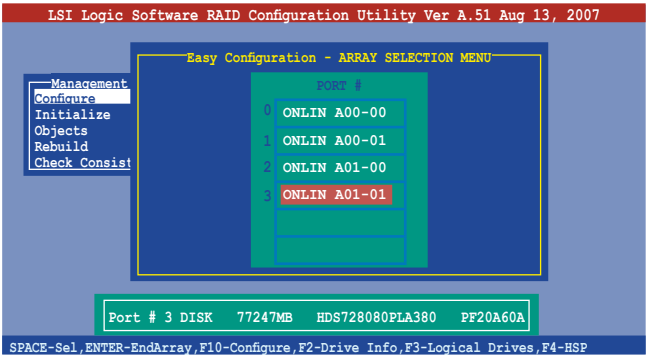


3. The **ARRAY SELECTION MENU** displays the available drives connected to the SATA ports. Select the drive(s) you want to include in the RAID set, then press <SpaceBar>. When selected, the drive indicator changes from **READY** to **ONLIN A[X]-[Y]**, where X is the array number, and Y is the drive number.

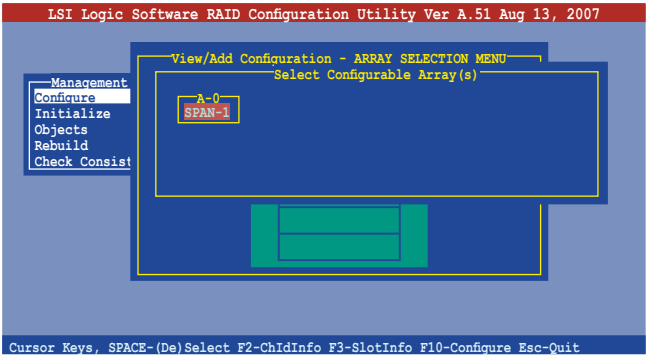


The information of the selected hard disk drive displays at the bottom of the screen.

4. Select all the drives required for the RAID set, then press <Enter>. The configurable array appears on screen.

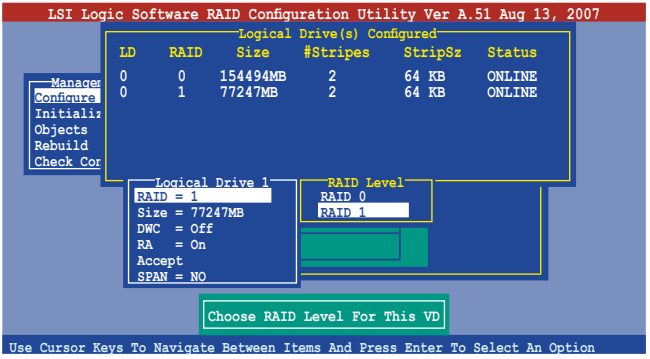


5. Press <F10>, select the configurable array, then press <SpaceBar>.

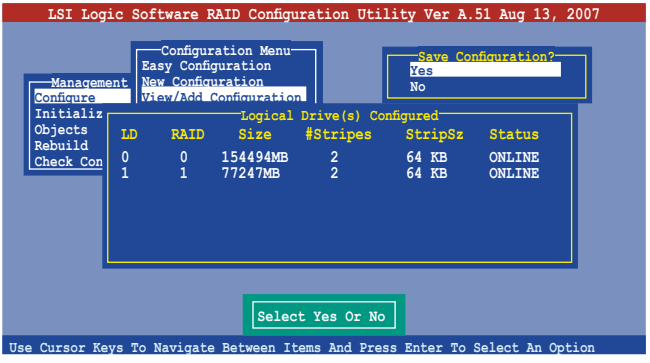


6. Press <F10> again, and select **RAID** from the **Logical Drive** menu, then press <Enter>.

7. Select the RAID level from the menu, then press <Enter>.



8. Follow steps 8 to 12 of the **Creating a RAID set: Using Easy Configuration section**.
9. When prompted, save the configuration, then press <Esc> to return to the **Management Menu**.



10. Follow steps 8 to 13 of the **Creating a RAID set: Using Easy Configuration** section to add the new RAID configuration.

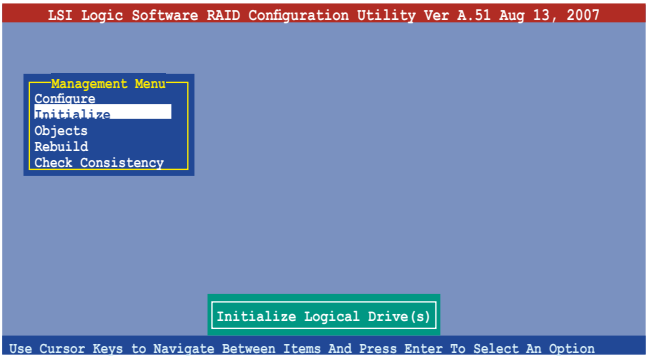
6.2.4 Initializing the logical drives

After creating the RAID set(s), you must initialize the logical drives. You may initialize the logical drives of a RAID set(s) using the **Initialize** or **Objects** command on the **Management Menu**.

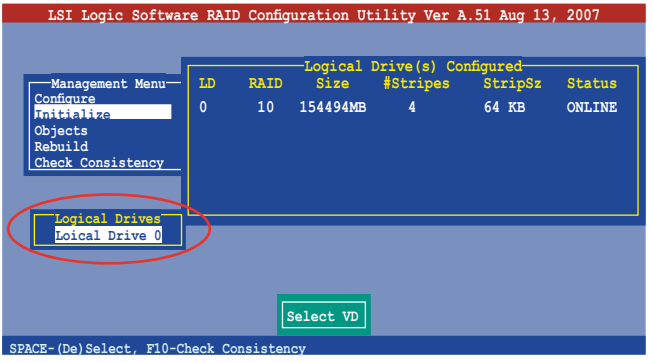
Using the Initialize command

To initialize the logical drive using the Initialize command:

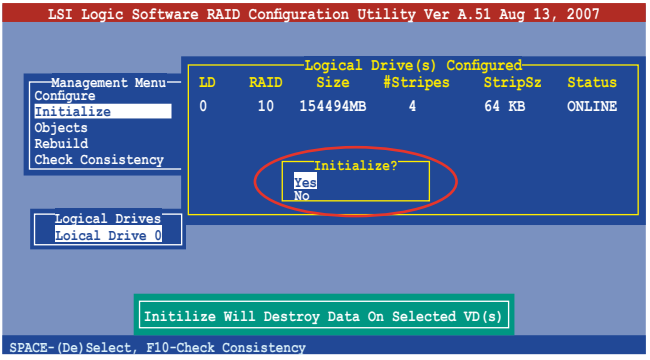
1. From the **Management Menu**, highlight **Initialize**, then press <Enter>.



2. The screen displays the available RAID set(s) and prompts you to select the logical drive to initialize. Use the arrow keys to select the logical drive from the **Logical Drive** selection, then press <Enter>.

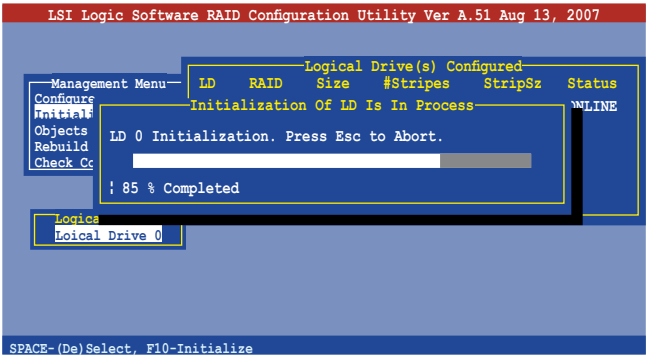


3. When prompted, press the <SpaceBar> to select **Yes** from the **Initialize?** dialog box, then press <Enter>. You may also press <F10> to initialize the drive without confirmation.

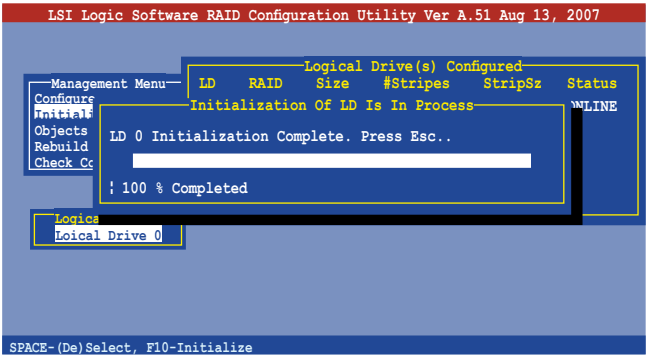


Initializing a logical drive(s) erases all data on the drive.

4. A progress bar appears on screen. If desired, press <Esc> to abort initialization.



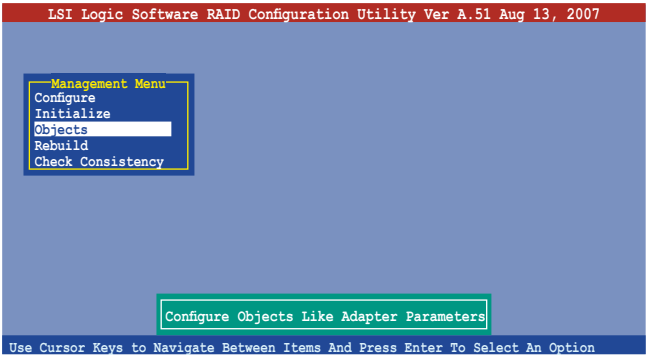
5. When initialization is completed, press <Esc>.



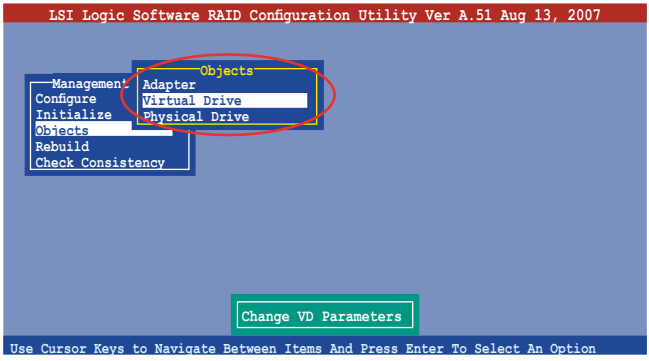
Using the Objects command

To initialize the logical drives using the **Objects** command:

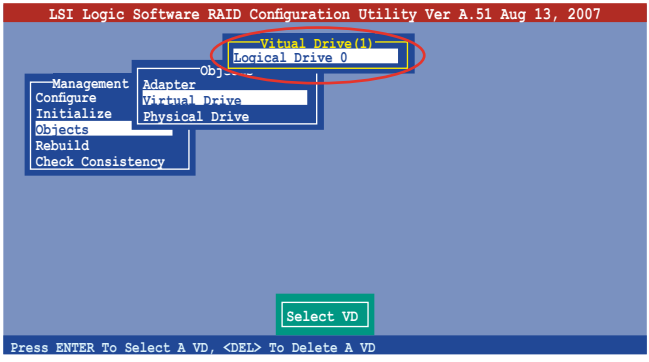
1. From the **Management Menu**, highlight **Objects**, then press <Enter>.



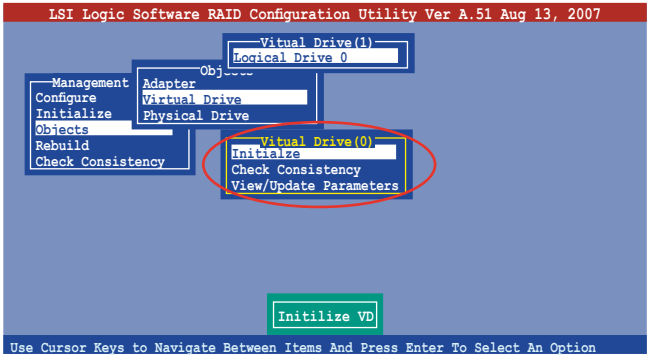
2. Select **Virtual Drive** from the **Objects** sub-menu, then press <Enter>.



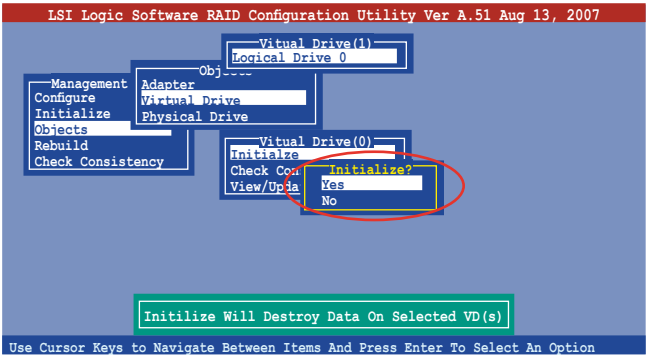
3. Select the logical drive to initialize from the **Virtual Drives** sub-menu, then press <Enter>.



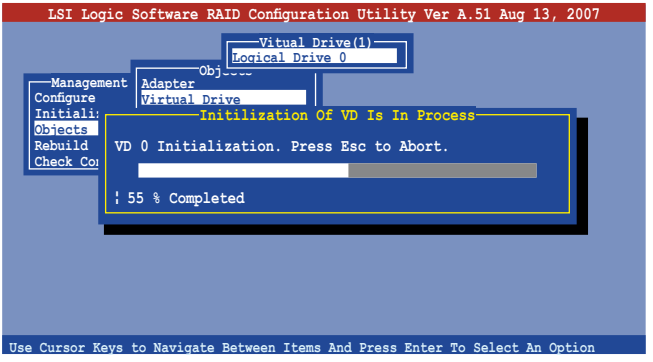
4. Select **Initialize** from the pop-up menu, then press <Enter> to start initialization.



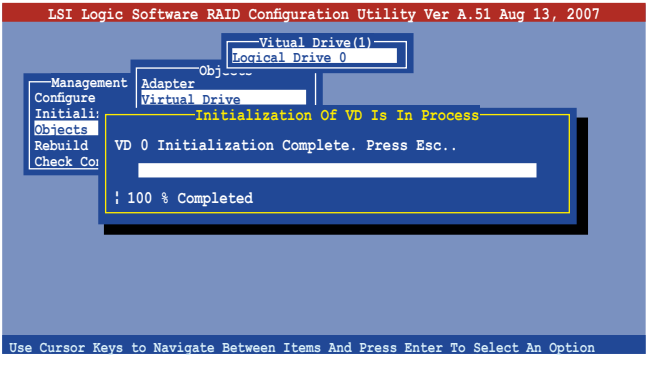
5. When prompted, press the <SpaceBar> to select **Yes** from the **Initialize?** dialog box, then press <Enter>.



6. A progress bar appears on screen. If desired, press <Esc> to abort initialization.



7. When initialization is completed, press <Esc>.

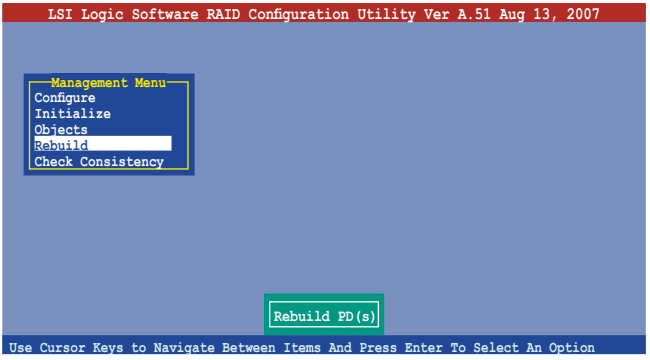


6.2.5 Rebuilding failed drives

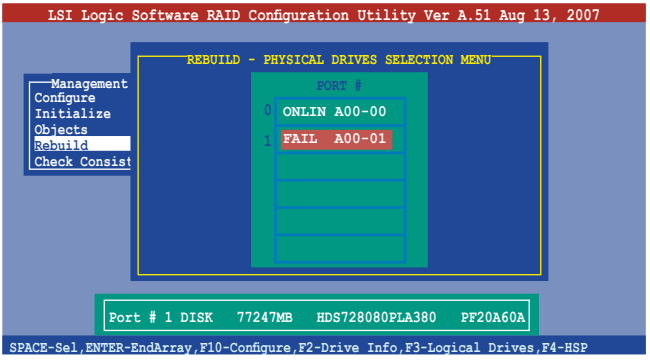
You can manually rebuild failed hard disk drives using the Rebuild command in the Management Menu.

To rebuild a failed hard disk drive:

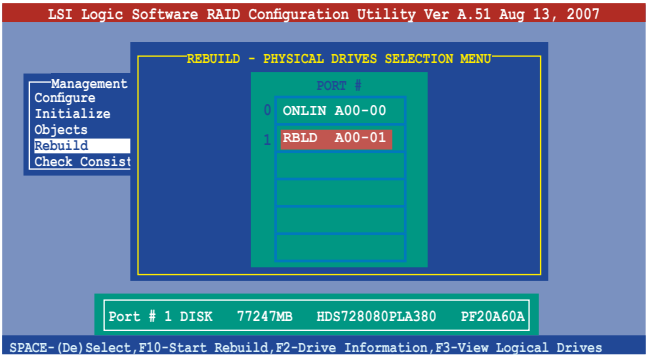
1. From the **Management Menu**, highlight **Rebuild**, then press <Enter>.



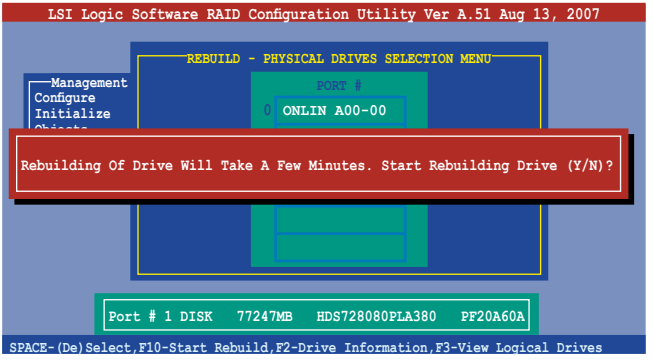
2. The **PHYSICAL DRIVES SELECTION MENU** displays the available drives connected to the SATA ports. Select the drive you want to rebuild, then press <SpaceBar>.



3. After selecting the drive to rebuild, press <F10>. The indicator for the selected drive now shows **RBLD**.



4. When prompted, press <Y> to to rebuild the drive.



5. When rebuild is complete, press any key to continue.

6.2.6 Checking the drives for data consistency

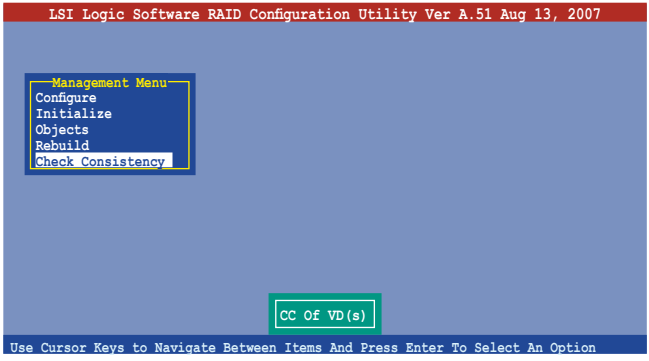
You can check and verify the accuracy of data redundancy in the selected logical drive. The utility can automatically detect and/or detect and correct any differences in data redundancy depending on the selected option in the **Objects** > **Adapter** menu.

The **Check Consistency** command is available only for logical drives included in a RAID 1 set.

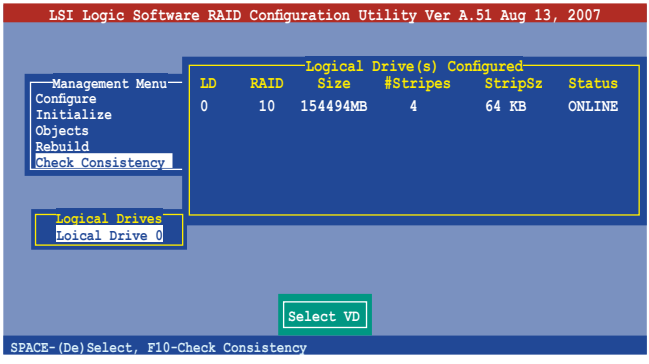
Using the Check Consistency

To check data consistency using the Check Consistency command:

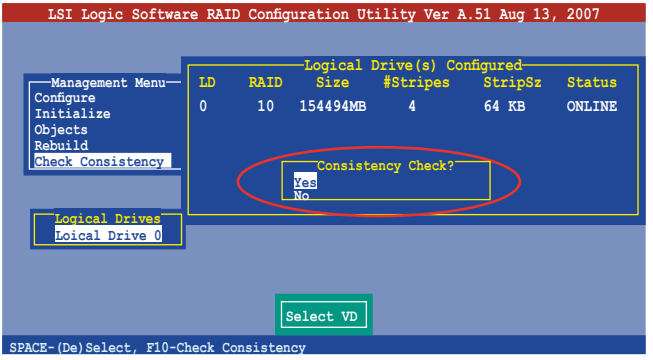
1. From the **Management Menu**, select **Check Consistency**, then press <Enter>.



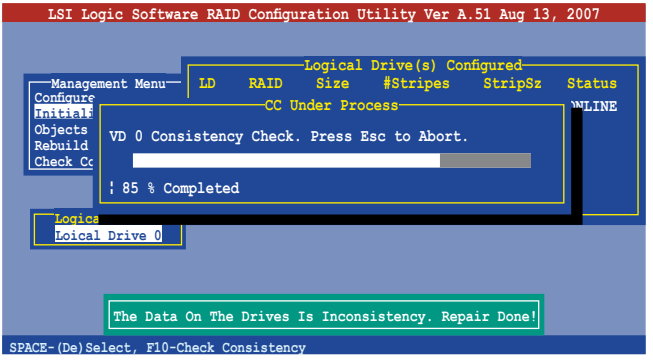
2. The screen displays the available RAID set(s) and prompts you to select the logical drive to check. Press the <Spacebar> to select the logical drive from the **Logical Drive** selection, then press <F10>.



3. When prompted, use the arrow keys to select **Yes** from the **Consistency Check** dialog box, then press <Enter>. You may also press <F10> to check the drive consistency.



A progress bar appears on screen.



4. While checking the disk consistency, press <Esc> to display the following options.
   - **Stop**: Stops the consistency check. The utility stores the percentage of disk checked, When you restart checking, it continues from the last percentage completed rather than from zero percent.
   - **Continue**: Continues the consistency check.
   - **Abort**: Aborts the consistency check. When you restart checking, it continues from zero percent.
5. When checking is complete, press any key to continue.

Using the Objects command

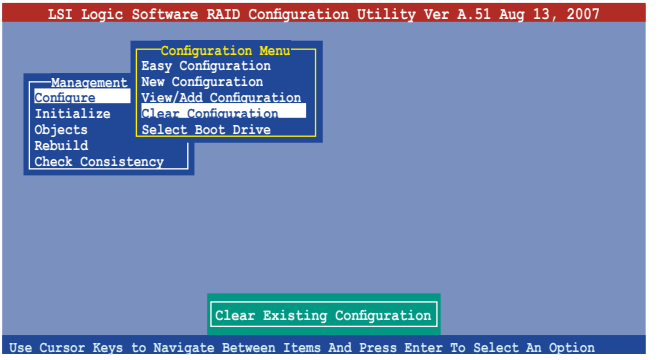
To check data consistency using the Objects command:

1. From the **Management Menu**, select Objects, then select **Logical Drive** from the menu.
2. Use the arrow keys to select the logical drive you want to check, then press <Enter>.
3. Select **Check Consistency** from the pop-up menu, then press <Enter>.
4. When prompted, use the arrow keys to select **Yes** from the dialog box to check the drive.
5. When checking is complete, press any key to continue.

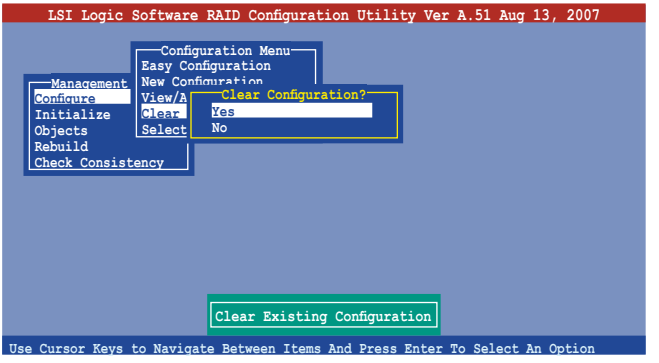
6.2.7 Deleting a RAID configuration

To delete a RAID configuration:

1. From the Management Menu, select Configure > Clear Configuration, then press <Enter>.



2. When prompted, use the arrow keys to select **Yes** from the **Clear Configuration?** dialog box, then press <Enter>.



The utility clears the current array.

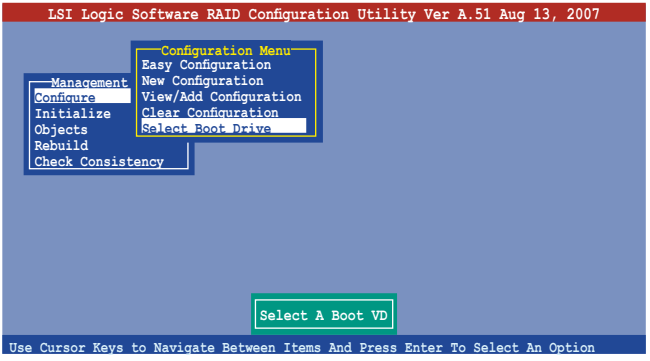
3. Press any key to continue.

6.2.8 Selecting the boot drive from a RAID set

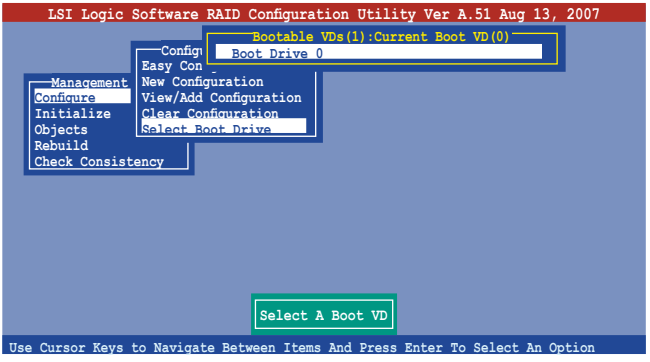
You must have created a new RAID configuration before you can select the boot drive from a RAID set. Refer to the Creating a RAID set: Using New Configuration section for details.

To select the boot drive from a RAID set:

1. From the Management Menu, select Configure > Select Boot Drive, then press <Enter>.



2. When prompted, use the arrow keys to select the bootable logical drive from the list, then press <Enter>.



3. The logical drive is selected as boot drive. Press any key to continue.

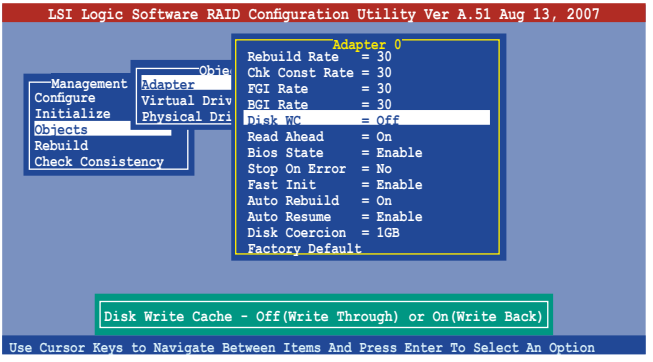
6.2.9 Enabling the WriteCache

You may enable the RAID controller's **WriteCache** option to improve the data transmission performance.

When you enable **WriteCache**, you may lose data when a power interruption occurs while transmitting or exchanging data among the drives.

To enable WriteCache:

1. From the **Management Menu**, select **Objects** > **Adapter**, then press <Enter> to display the adapter properties.
2. Select **WriteCache**, then press <Enter> to turn the option On (enabled).



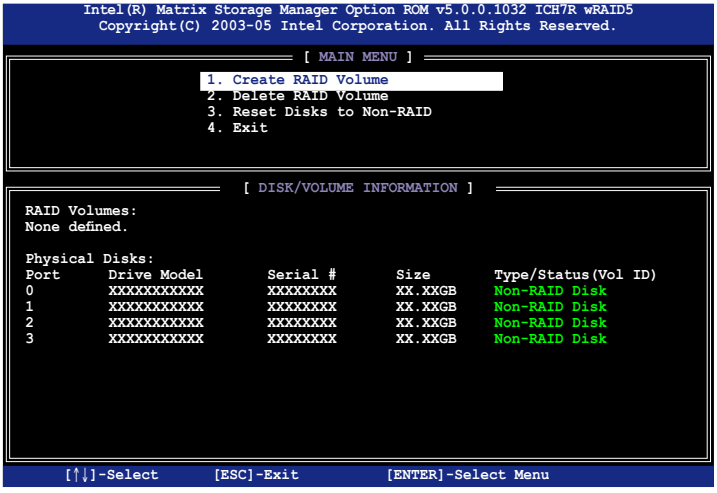
3. When finished, press any key to continue.

6.3 Intel® Matrix Storage Manager Option ROM Utility (For PA4 model only)

The Intel® Matrix Storage Manager Option ROM utility allows you to create RAID 0, RAID 1, RAID 0+1, and RAID 5 set(s) from Serial ATA hard disk drives.

To enter the Intel® Matrix Storage Manager Option ROM Utility:

1. Turn on the system after installing all Serial ATA hard disk drives.
2. During POST, press <Ctrl+I> to display the utility main menu.



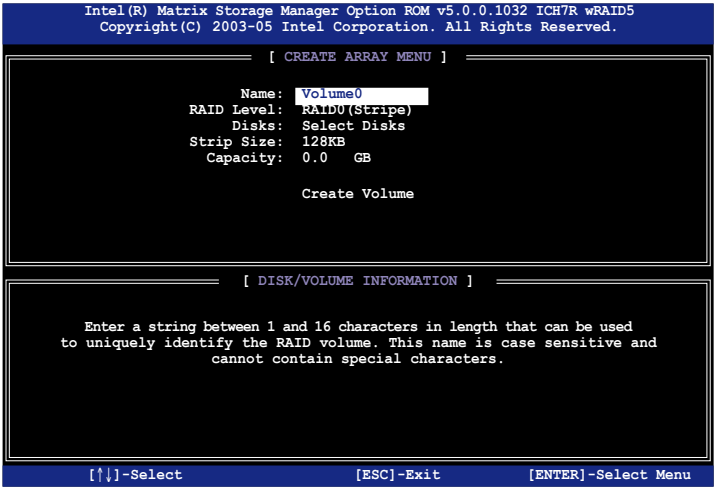
The navigation keys at the bottom of the screen allow you to move through the menus and select the menu options.

The RAID BIOS setup screens shown in this section are for reference only and may not exactly match the items on your screen.

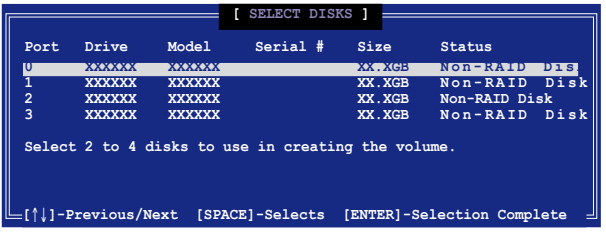
6.3.1 Creating a RAID 0 set (Stripe)

To create a RAID 0 set:

1. From the utility main menu, select **1. Create RAID Volume**, then press <Enter>. This screen appears.



2. Enter a name for the RAID 0 set, then press <Enter>.
3. Highlight **RAID Level**, press the up/down arrow key to select RAID 0 (Stripe), then press <Enter>.
4. Highlight the **Disks** item, then press <Enter> to select the hard disk drives you want to include in the RAID set. The **SELECT DISKS** screen appears.

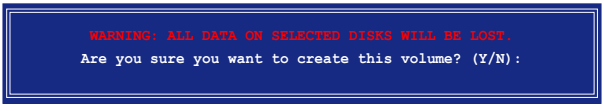


5. Use the up/down arrow key to highlight a drive, then press <Space> to select. A small triangle marks the selected drive. Press <Enter> after completing your selection.

6. Use the up/down arrow key to select the stripe size for the RAID 0 array, then press <Enter>. The available stripe size values range from 4 KB to 128 KB. The default stripe size is 128 KB..

A lower stripe size is recommended for server systems. A higher stripe size is recommended for multimedia computer systems used mainly for audio and video editing.

7. Highlight the **Capacity** item, enter the desired RAID volume capacity, then press <Enter>. The default value indicates the maximum allowed capacity.
8. When the **Create Volume** item is highlighted, press <Enter>.
A warning message appears.

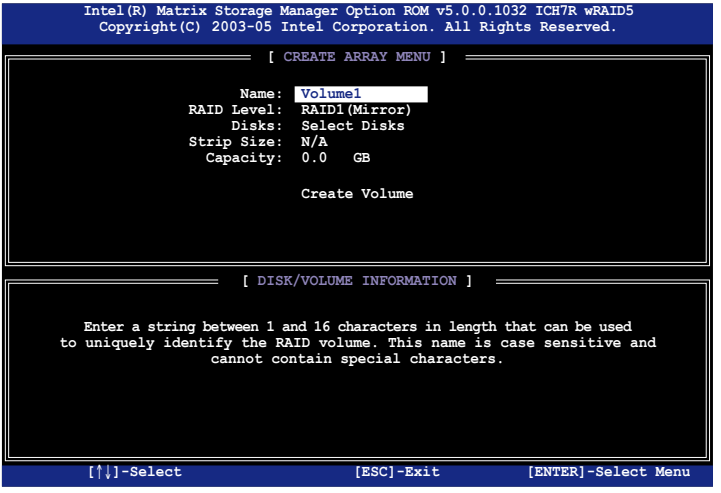


9. Press <Y> to create the RAID volume and return to the main menu, or <N> to go back to the **Create Array** menu.

6.3.2 Creating a RAID 1 set (Mirror)

To create a RAID 1 set:

1. From the utility main menu, select 1. Create RAID Volume, then press <Enter>. This screen appears.

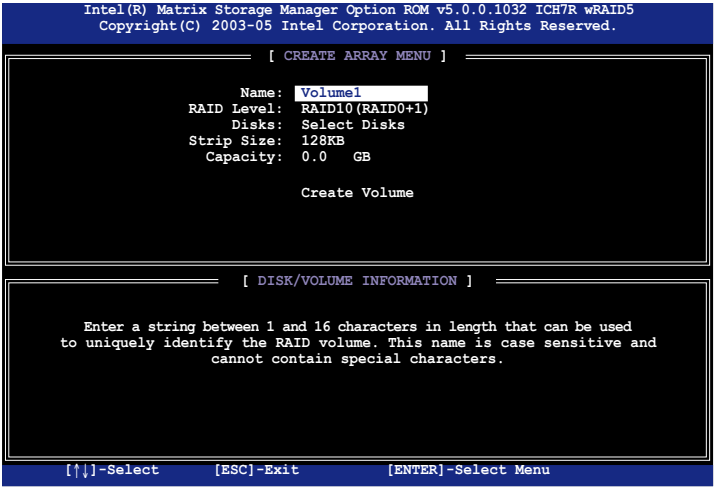


2. Enter a name for the RAID 1 set, then press <Enter>.
3. Highlight **RAID Level**, press the up/down arrow key to select **RAID 1 (Mirror)**, then press <Enter>.
4. Follow steps 4 to 5 and 7 to 9 of the previous section to create the RAID 1 set.

6.3.3 Creating a RAID 10 set (Stripe + Mirror)

To create a RAID 10 set:

1. From the utility main menu, select 1. Create RAID Volume, then press <Enter>. This screen appears.

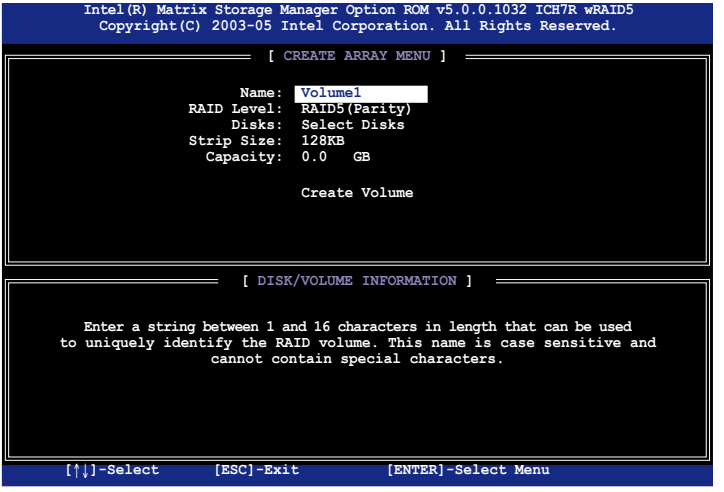


2. Enter a name for the RAID 10 set, then press <Enter>.
3. Highlight **RAID Level**, press the up/down arrow key to select RAID 10 (RAID0+1), then press <Enter>.
4. Follow steps 4 to 9 of section "**6.3.1 Creating a RAID 0 set (striped)**" to create the RAID 10 set.

6.3.4 Creating a RAID 5 set (Parity)

To create a RAID 5 set:

1. From the utility main menu, select 1. Create RAID Volume, then press <Enter>. This screen appears.



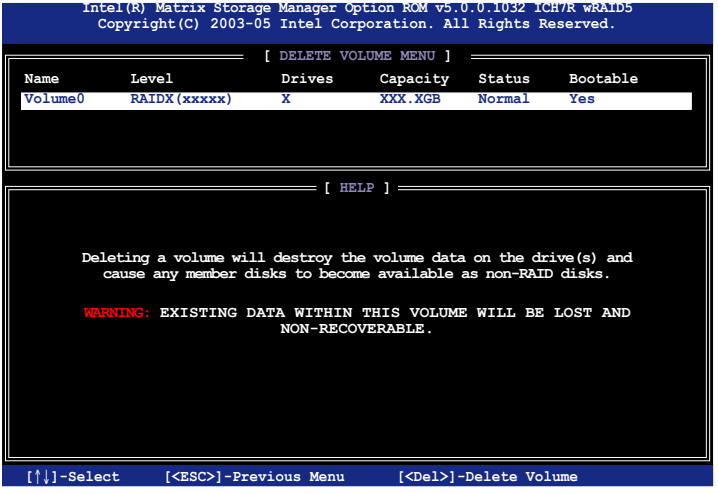
2. Enter a name for the RAID 10 set, then press <Enter>.
3. Highlight **RAID Level**, press the up/down arrow key to select RAID 5, then press <Enter>.
4. Follow steps 4 to 9 of section “6.3.1 Creating a RAID 0 set (striped)” to create the RAID 5 set.

6.3.5 Deleting a RAID set

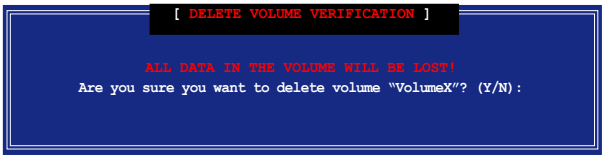
Take caution when deleting a RAID set. You will lose all data on the hard disk drives when you delete a RAID set.

To delete a RAID set:

1. From the utility main menu, select **2. Delete RAID Volume**, then press <Enter> to display this screen.



2. Use the up/down arrow key to select the RAID set you want to delete, then press <Del>. This window appears.



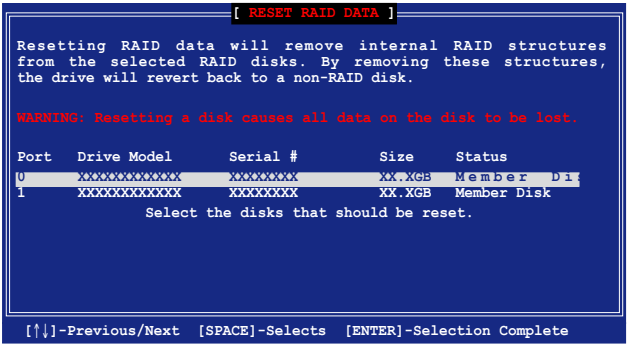
3. Press <Y> to delete the RAID set and return to the utility main menu; otherwise, press <N> to return to the **Delete Volume** menu.

6.3.6 Resetting disks to Non-RAID

Take caution before you reset a RAID volume hard disk drive to non-RAID. Resetting a RAID volume hard disk drive deletes all internal RAID structure on the drive.

To reset a RAID set hard disk drive:

1. From the utility main menu, select **3. Reset Disks to Non-RAID**, then press <Enter> to display this screen.



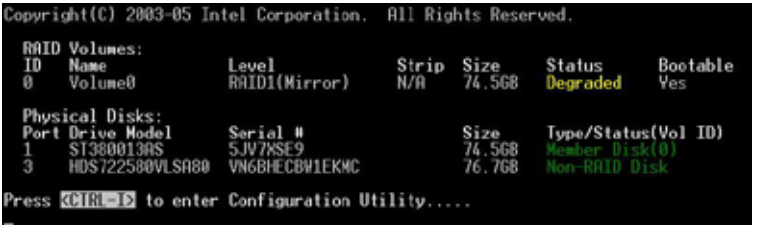
2. Use the up/down arrow key to highlight the RAID set drive you want to reset, then press <Space> to select.
3. Press <Enter> to reset the RAID set drive. A confirmation message appears.
4. Press <Y> to reset the drive or press <N> to return to the utility main menu.
5. Follow steps 2 to 4 to select and reset other RAID set drives.

6.3.7 Rebuilding the RAID

This option is only for the RAID 1, RAID 5 and RAID 10 level.

Rebuilding the RAID with other non-RAID disk:

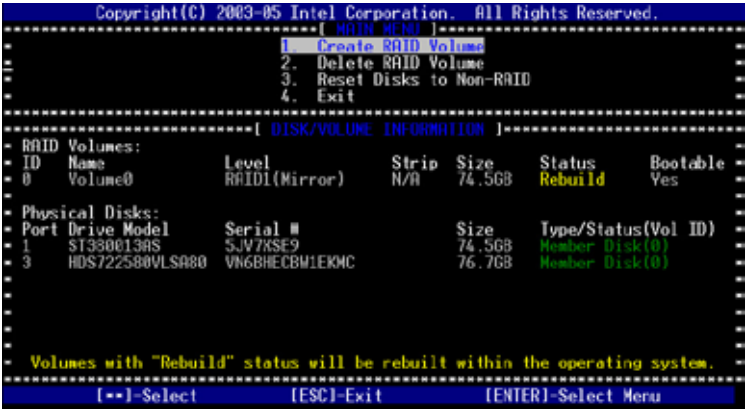
1. If one member of physical SATA Hard disk within the array is off-line or failed, the status of array will become to be degraded from normal. The following displays as:



2. Press <Ctrl-I> to enter the Intel Matrix Storage Manager RAID configuration utility after POST.
3. If there is available Non-RAID SATA Hard Disk, the utility will prompt the windows for rebuilding the RAID. Press <Enter> to select the port of destination disk for rebuilding or press <ESC> to exit

The size of destination disk for rebuilding should be the same or bigger as the original hard disk.

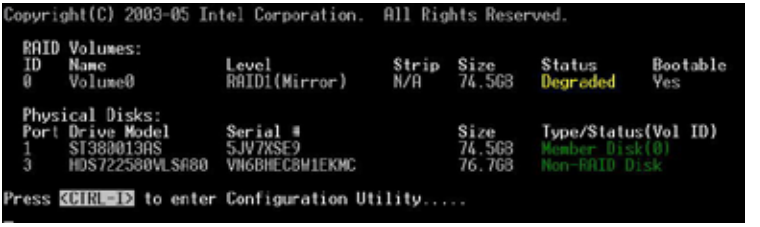
4. After selecting, the volumes with “Rebuild” status will be rebuilt within the operating system.



5. Exit the SATA RAID utility. When operating system is running, select the Intel Matrix Storage Console from the Start Menu or click the Intel Matrix Storage Manager tray icon.
6. From the View menu, select ‘Advanced Mode’ to display a detailed view of the Intel Matrix Storage Console.
7. From the Volumes view in the device pane, select the RAID volume. The status will display ‘Rebuilding % complete’. After the rebuild is complete, the status will display ‘Normal’.

Rebuilding the RAID with new installed disk:

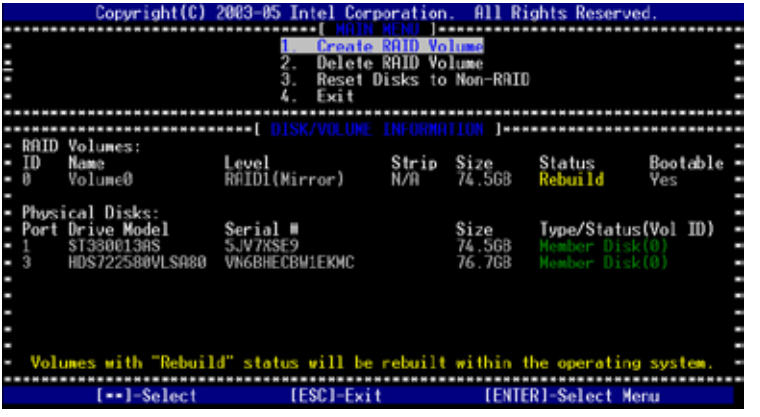
1. If one member of physical SATA Hard disk within the array is off-line or failed, the status of array will become to be degraded from normal. The following displays as.



2. Remove the failed SATA hard disk and install the same specification of new SATA hard disk into the same SATA Port. After reboot, the rebuild will occur automatically.

The size of new disk for rebuilding should be the same or bigger as the original hard disk.

3. After selecting, the volumes with “Rebuild” status will be rebuilt within the operating system.



4. Exit the SATA RAID utility. When the operating system is running, select the Intel Matrix Storage Console from the Start Menu or click the Intel Matrix Storage Manager tray icon.
5. From the View menu, select ‘Advanced Mode’ to display a detailed view of the Intel Matrix Storage Console.
6. From the Volumes view in the device pane, select the RAID volume. The status will display ‘Rebuilding % complete’. After the rebuild is complete, the status will display ‘Normal’.

6.3.8 Exiting the Intel® Matrix Storage Manager

To exit the utility:

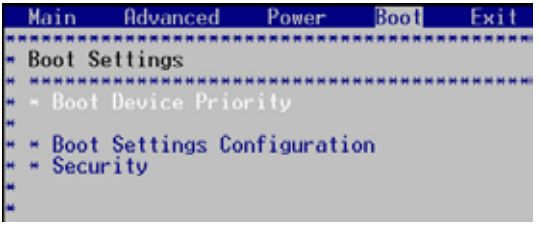
1. From the utility main menu, select **4. Exit**, then press <Enter>. This window appears.

2. Press <Y> to exit or press <N> to return to the utility main menu.

6.3.9 Setting the Boot array use MB BIOS Setup Utility

1. When creating multi-raid via Intel(r) Matrix Storage Manager RAID, we would like to assign one array to be the boot drive. The following shows as the status of current arrays:

2. Re-boot the system and press <Del> to enter the Motherboard BIOS Setup Utility during POST.
3. Go to [Boot] menu —> [Boot Device Priority]. Then, select the desired boot array and use <+> or <-> key to change the boot device priority.



4. Exit the BIOS Setup Utility and save the changes.

6.3.10 Global Array Manager

You may also create a RAID set(s) in Windows® operating environment using the Global Array Manager (GAM) application. The GAM application is available from the motherboard support CD.

Refer to the GAM user guide in the motherboard support CD for details.

6.4 LSI Corporation MPT Setup Utility (for PX4 model only)

The LSI Corporation MPT Setup Utility is an integrated RAID solution that allows you to create the following RAID set(s) from SAS hard disk drives supported by the LSI SAS 1064E controller:

- RAID 1 (Integrated Mirroring)
- RAID 1E (Integrated Mirroring Enhanced)
- RAID 0 (Integrated Striping)

- You may use disks of different sizes in IM and IME volumes; however, the size of the smallest disk determines the "logical" size of each member disk.
- DO NOT combine Serial ATA and SAS disk drives in one volume.
- The RAID setup screens shown in this section are for reference only and may not exactly match the items on your screen due to the controller version difference.

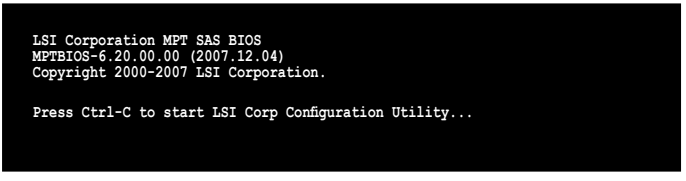
6.4.1 Integrated Mirroring volume

The Integrated Mirroring (IM) feature supports simultaneous mirrored volumes with two disks (IM).

The IM feature supports hot swap capability, so when a disk in an IM volume fails, you can easily restore the volume, and the swapped disk is automatically re-mirrored.

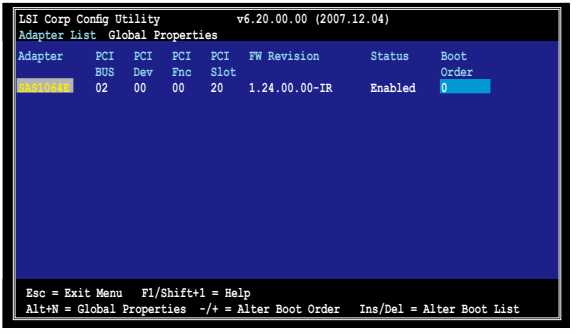
To create an IM volume:

1. Turn on the system after installing all SAS hard disk drives.
2. During POST, press <Ctrl+C> to enter the SAS configuration utility.



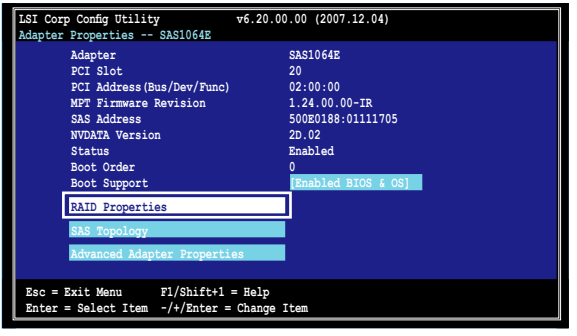
To avoid data loss, do not turn off the system when rebuilding.

3. The following screen appears. Select a channel and press <Enter> to enter the setup.

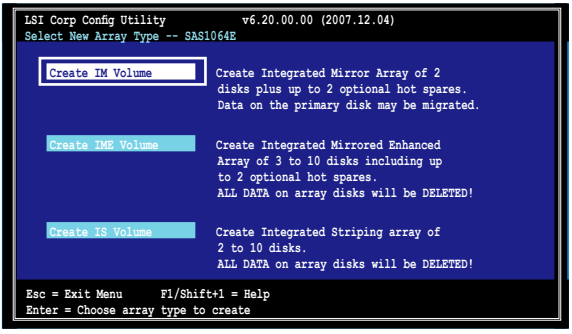


The numbers of the channel depend on the controller.

4. The **Adapter Properties** screen appears.
Use the arrow keys to select **RAID Properties**, then press <Enter>.

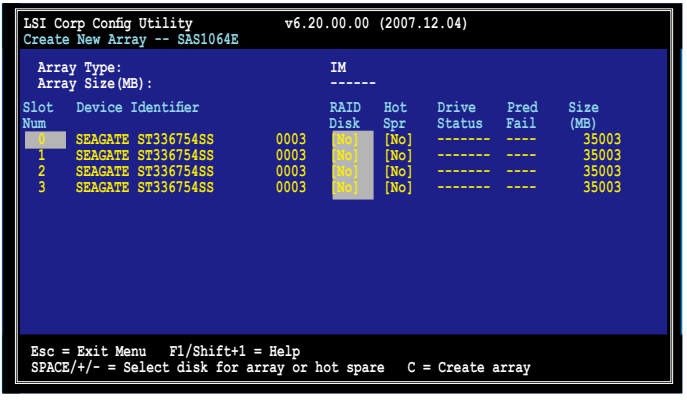


5. The **Select New Array Type** screen appears.
Use the arrow keys to select **Create IM Volume**, then press <Enter>.



6. The **Create New Array** screen shows the disks you can add to make up the IM volume. Use the arrow key to select a disk, then move the cursor to the **RAID Disk** column. To include this disk in the array, press <+>, <->, or <Space>.

You may also specify the Hot Spare disk here. Select the disk, then move the cursor to the **Hot Spr** column, then press <+>, <->, or <Space>.



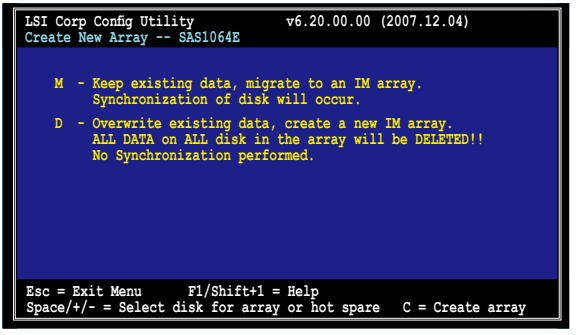
By default, the **RAID Disk** field shows **No** before array creation. This field is grayed out under the following conditions:

- The disk does not meet the minimum requirements for use in a RAID array.
- The disk is not large enough to mirror existing data on the primary drive.
- The disk has been selected as the Hot Spare for the RAID array.
- The disk is already part of another array.

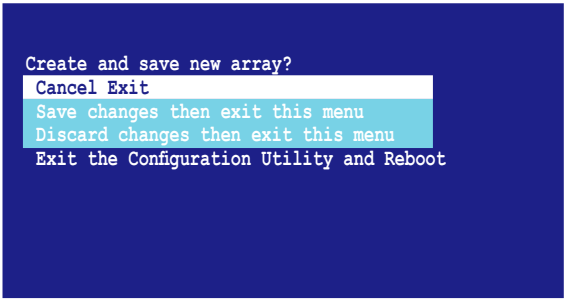
7. A confirmation screen appears.

   Press <M> to keep existing data on the first disk. If you choose this option, data on the first disk will be mirrored on the second disk that you will add to the volume later. Make sure the data you want to mirror is on the first disk.

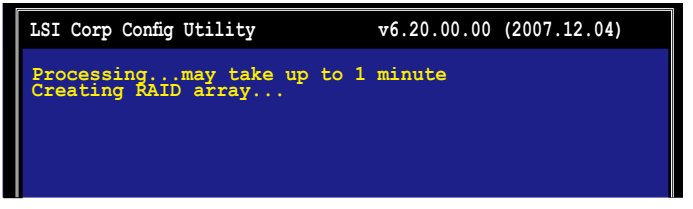
   Press <D> to overwrite any data and create the new IM array.



8. Repeat steps 5 and 6 to add the second disk to the volume.
9. When done, press <C> to create the array, then select **Save changes then exit this menu**.



10. The utility creates the array.

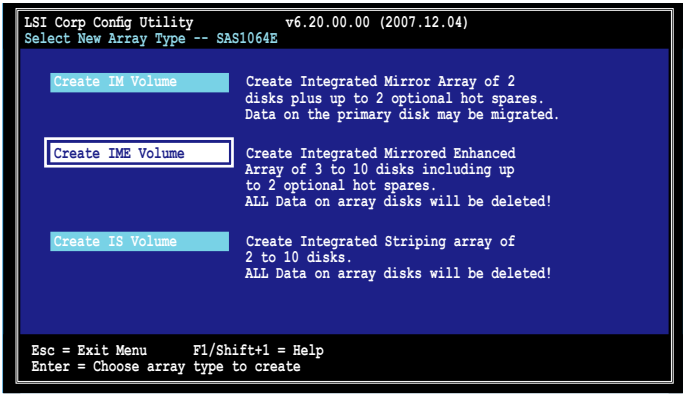


6.4.2 Integrated Mirroring Enhanced volume

The Integrated Mirroring Enhanced (IME) supports three to ten disks, or seven mirrored disks plus two hot spare disks.

To create an IME volume:

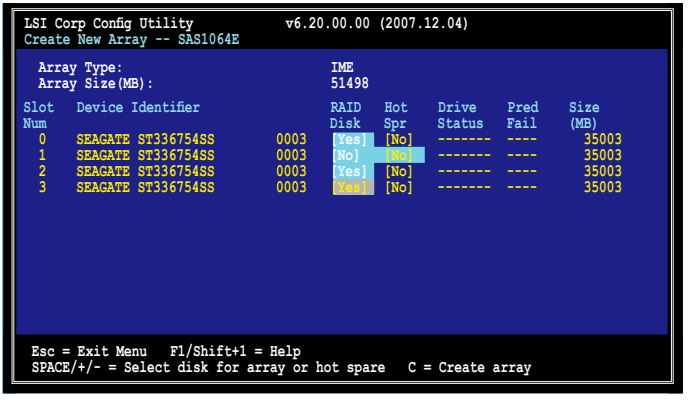
1. Follow steps 1–4 of the section **Integrated Mirroring volume**.
2. The **Select New Array Type** screen appears.
   Use the arrow keys to select **Create IME Volume**, then press <Enter>.



3. The **Create New Array** screen shows the disks you can add to make up the IME volume.

   Integrated Mirroring Enhanced (IME) supports three to ten disks, or seven mirrored disks plus two hot spare disks. Use the arrow key to select a disk, then move the cursor to the **RAID Disk** column. To include this disk in the array, press <+>, <->, or <Space>.

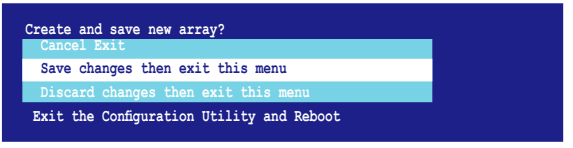
   You may also specify the Hot Spare disk here. Select the disk, then move the cursor to the **Hot Spr** column, then press <+>, <->, or <Space>.



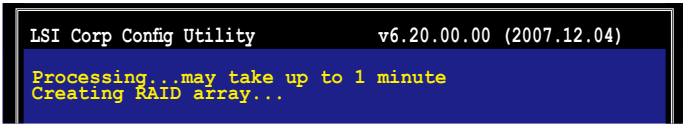
By default, the **RAID Disk** field shows **No** before array creation. This field is grayed out under the following conditions:

- The disk does not meet the minimum requirements for use in a RAID array.
- The disk is not large enough to mirror existing data on the primary drive.
- The disk has been selected as the Hot Spare for the RAID array.
- The disk is already part of another array.

4. Repeat step 3 to add the other disks to the volume.
5. When done, press <C> to create the array, then select **Save changes then exit this menu**.



6. The utility creates the array.

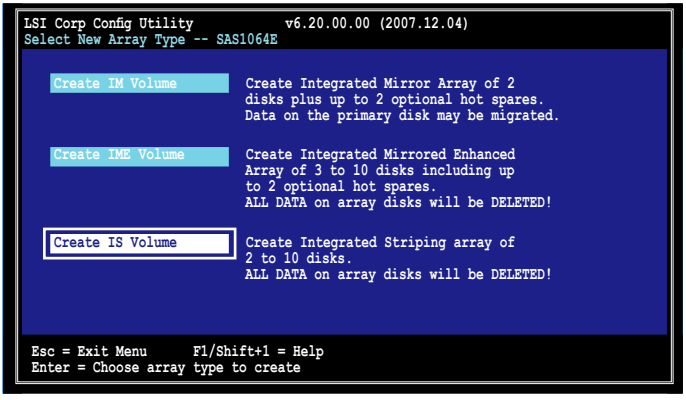


6.4.3 Integrated Striping (IS) volume

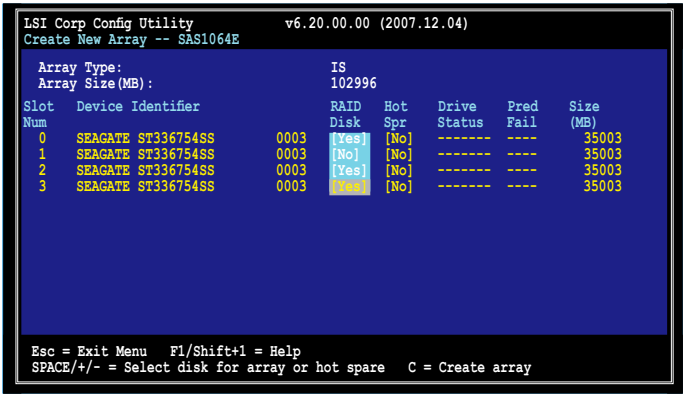
The Integrated Striping (IS) feature provides RAID 0 functionality, supporting volumes with two to ten disks. You may combine an IS volume with an IM or IME volume.

To create an IS volume:

1. Follow steps 1–4 of the section **Integrated Mirroring volume**.
2. The **Select New Array Type** screen appears.
   Use the arrow keys to select **Create IS Volume**, then press <Enter>.



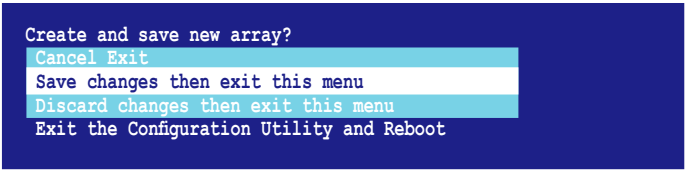
3. The **Create New Array** screen shows the disks you can add to make up the IS volume. Use the arrow key to select a disk, then move the cursor to the **RAID Disk** column. To include this disk in the array, press <+>, <->, or <Space>.



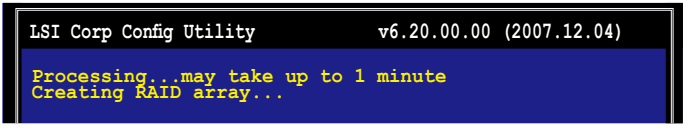
By default, the **RAID Disk** field shows **No** before array creation. This field is grayed out under the following conditions:

- The disk does not meet the minimum requirements for use in a RAID array.
- The disk is not large enough to mirror existing data on the primary drive.
- The disk has been selected as the Hot Spare for the RAID array.
- The disk is already part of another array.

4. Repeat step 3 to add the other disks to the volume.
5. When done, press <C> to create the array, then select **Save changes then exit this menu**.



6. The utility creates the array.



6.4.4 Managing Arrays

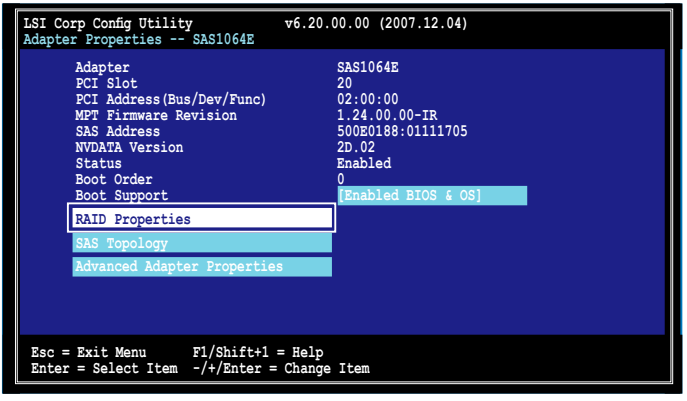
The LSI Corporation MPT Setup Utility allows you to perform other tasks related to configuring and maintaining IM and IME volumes.

Refer to this section to view volume properties, manage the hot spare disk, synchronize the array, activate the array, and delete the array.

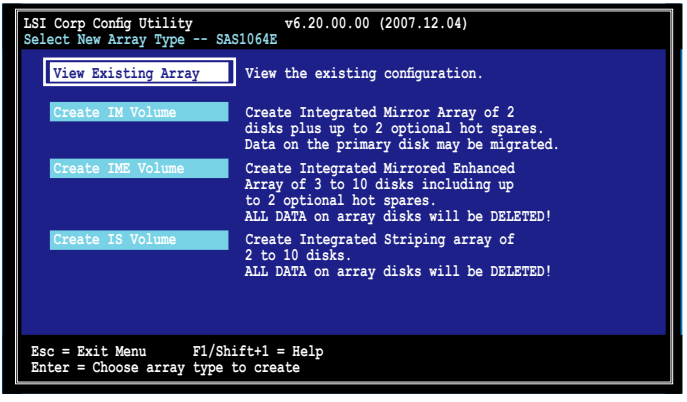
Viewing volume properties

To view volume properties:

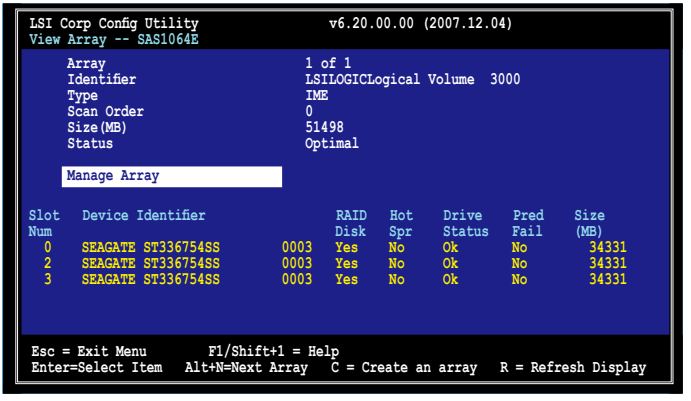
1. On the main menu, select **RAID Properties**.



2. On the next screen that appears, select **View Existing Array**.



3. The **View Array** screen appears. Here you can view properties of the RAID array(s) created. If you have configured a hot spare, it will also be listed. If you created more than one array, you may view the next array by pressing <Alt+N>.



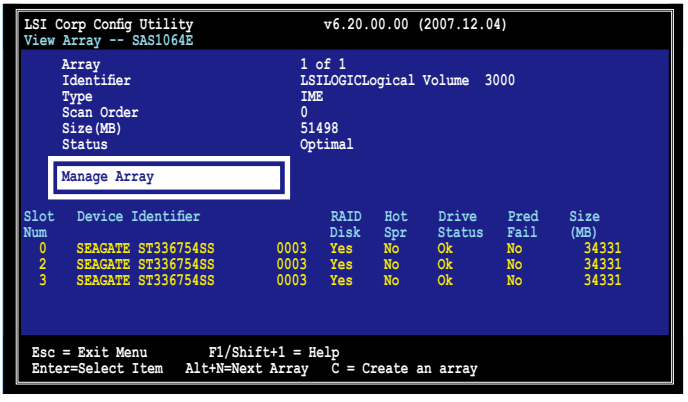
Managing hot spares

You may configure one disk as a global hot spare to protect critical data on the IM/IME volume(s). You may create the hot spare disk at the same time you create the IM/IME volume. Refer to this section when adding a hot spare disk on an existing volume.

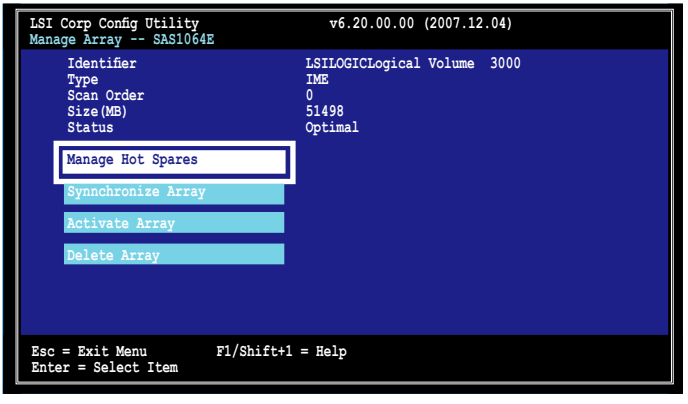
If a disk on an IM/IME volume fails, the utility automatically rebuilds the failed disk data on the hot spare. When the failed disk is replaced, the utility assigns the replacement as the new hot spare.

To create a hot spare:

1. Follow steps 1–3 of the section **Viewing volume properties**.
2. From the **View Array** screen, select **Manage Array**, then press <Enter>.

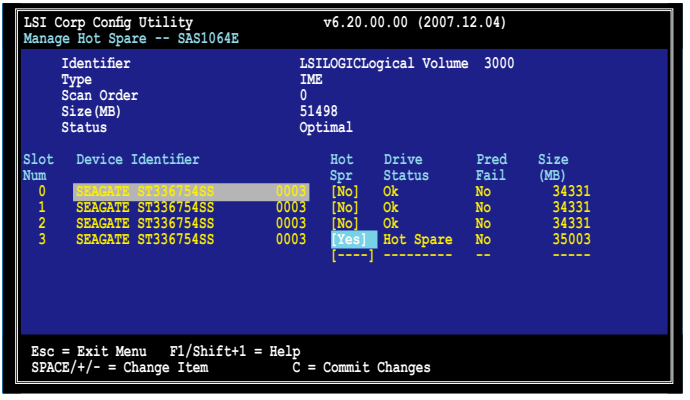


3. From the **Manage Array** screen, select **Manage Hot Spares**, then press <Enter>.



4. Use the arrow key to select the disk you would like to configure as hot spare, then move the cursor to the **Hot Spr** column. Press <+>, <->, or <Space>. The **Drive Status** column field now shows **Hot Spare**.

   Press <C> to commit the changes.

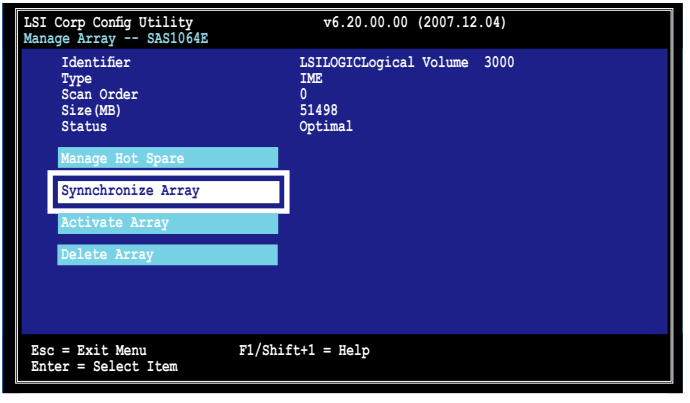


Synchronizing the array

Synchronizing the array allows the utility to resynchronize data on the mirrored disk in the array. This procedure is seldom required because data synchronization is automatically done during normal operation.

To synchronize the array:

1. Follow steps 1–3 of the section **Viewing volume properties** and step 2 of the section **Managing hot spares**.
2. From the **Manage Array** screen select **Synchronize Array**, then press <Enter>.



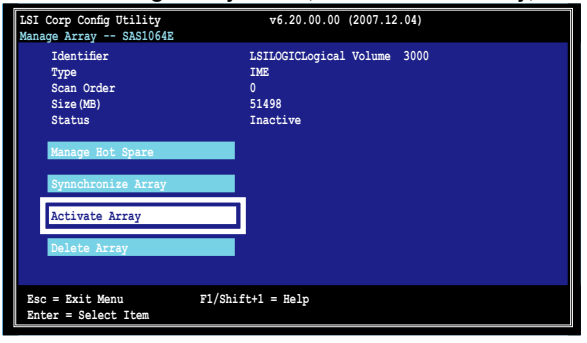
3. Press <Y> to begin the synchronization, or <N> to cancel.

Activating an array

If an array is removed from one controller/computer or moved to another, the array is considered inactive. When you add the array back to the system, you may reactivate the array.

To activate the array:

1. From the **Manage Array** screen, select **Activate Array**, then press <Enter>.



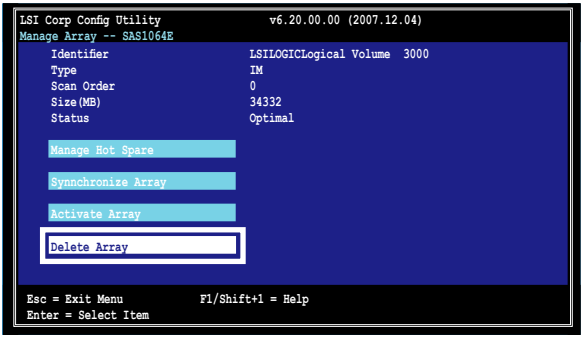
2. Press <Y> to activate, or <N> to cancel.

Deleting an array

- You cannot recover lost data if you delete an array. Make sure you back up important data before deleting an array.
- If you delete an IM (RAID 1) volume, the data is preserved on the primary disk.

To delete an array:

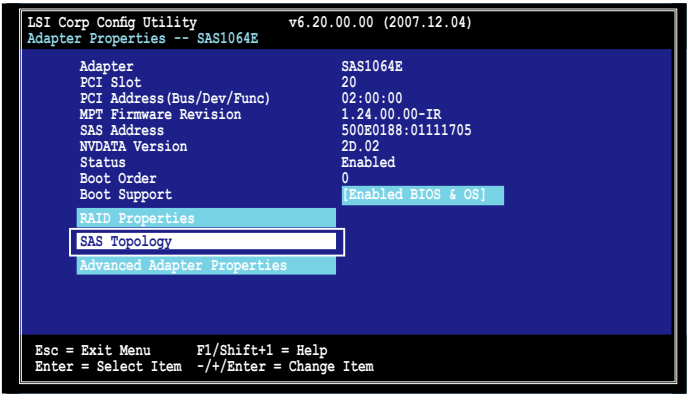
1. From the **Manage Array** screen, select **Delete Array**, then press <Enter>.



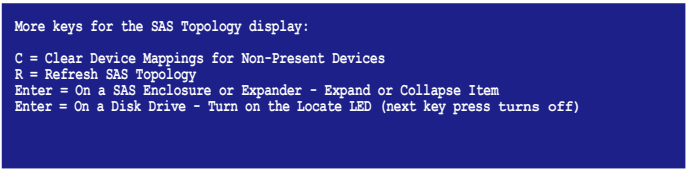
2. Press <Y> to delete, or <N> to cancel.

6.4.5 Viewing SAS topology

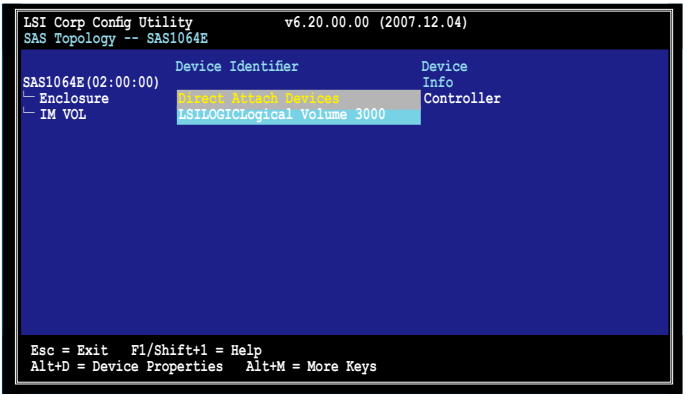
1. From the **Adapter Properties** screen, select **SAS Topology**.



Press <Alt+D> to display device properties, or <Alt+M> to display more keys.

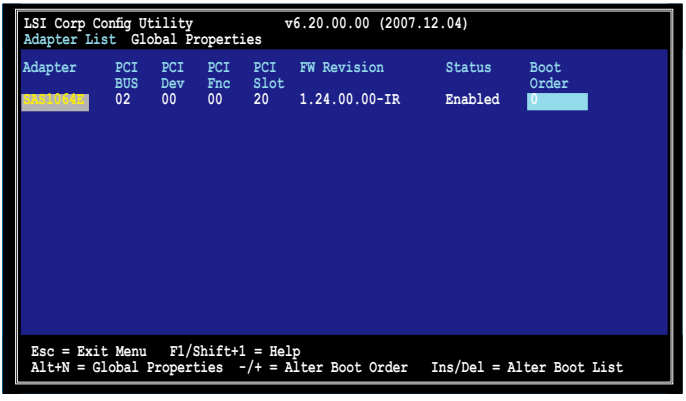


2. Information about the volume and its member-disks are then displayed.



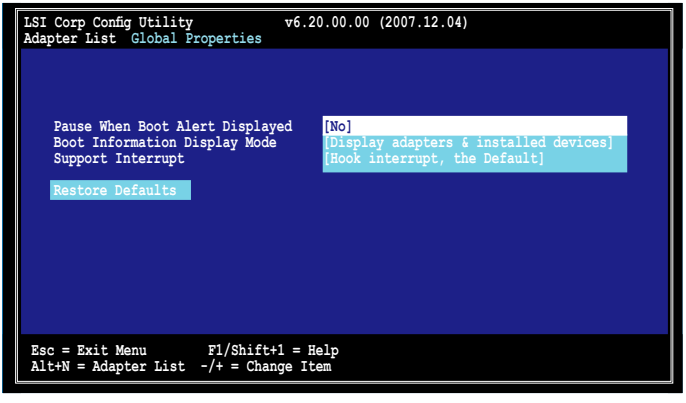
6.4.6 Global Properties

From the **Adapter List** screen, press <Alt+N> to enter **Global Properties** menu. From the menu you may change related settings.



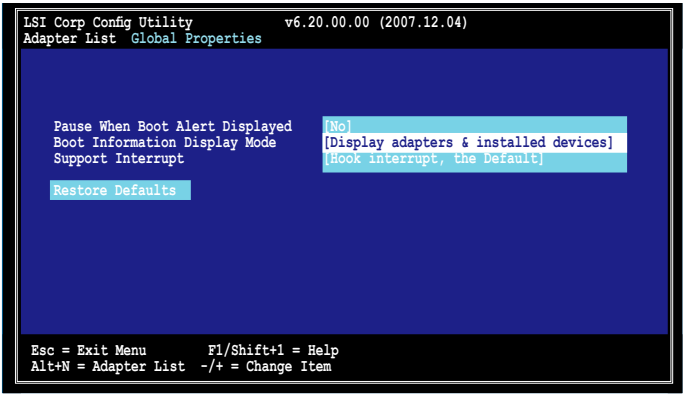
Pause When Boot Alert Displayed

Sets whether to pause or not when the boot alert displays.
Configuration options: [Yes] [No]



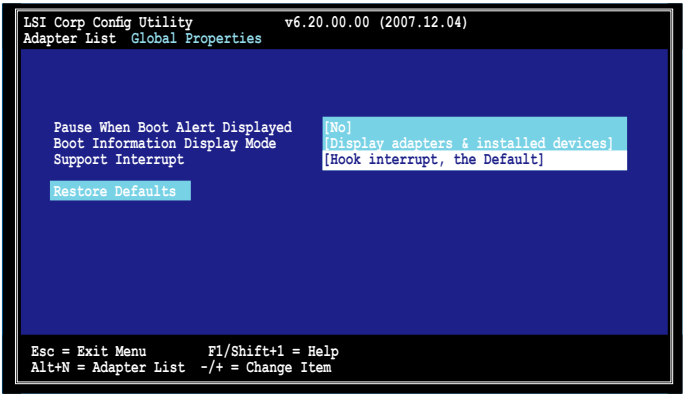
Boot Information Display Mode

Sets the disk information display mode.
Configuration options: [Display adapters & installed devices]
[Display adapters only] [Display adapters and all devices]
[Display minimal information]



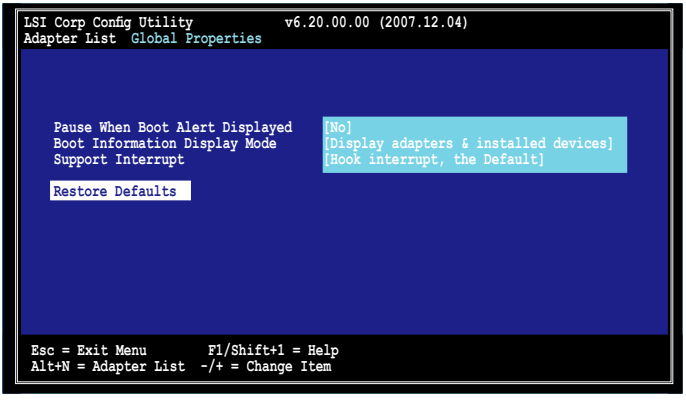
Support Interrupt

Configuration options: [Hook interrupt, the Default] [Bypass interrupt hook]



Restore Defaults

This option allows you to discard the selections you made and restore the system defaults.



Chapter 7

This chapter provides information on RAID configurations, RAID driver installation, and LAN driver installation for this motherboard.

Driver installation

7.1 RAID driver installation

After creating the RAID sets for your server system, you are now ready to install an operating system to the independent hard disk drive or bootable array. This part provides instructions on how to install the RAID controller drivers during OS installation.

7.1.1 Creating a RAID driver disk (for PA4 Model)

You may have to use another system to create the RAID driver disk from the system / motherboard support CD or from the Internet.

A floppy disk with the RAID driver is required when installing Windows® Server or Red Hat® Enterprise / SuSE operating system on a hard disk drive that is included in a RAID set. You can create a RAID driver disk in DOS (using the Makedisk application in the support CD).

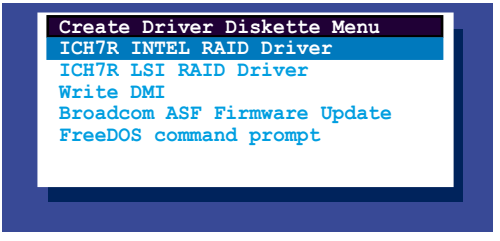
Boot from CD-ROM (DOS)

To create a RAID driver disk in DOS environment:

1. Place the motherboard support CD in the optical drive.
2. Restart the computer, then enter the BIOS Setup.
3. Select the optical drive as the first boot priority to boot from the support CD. Save your changes, then exit the BIOS Setup.
4. Restart the computer.
5. Press any key when prompted to boot from CD.

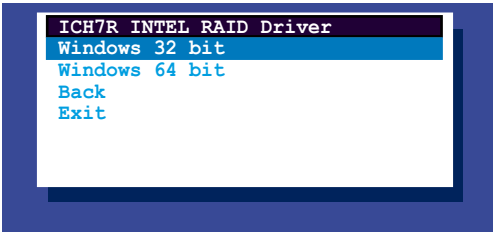
```
Loading FreeDOS FAT KERNEL GO!
Press any key to boot from CDROM...
```

The Makedisk menu appears.

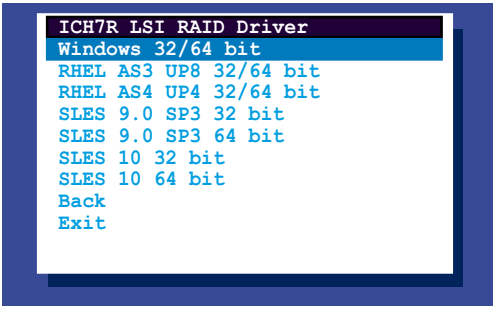


6. Use the arrow keys to select the type of RAID driver disk you want to create and press <Enter> to enter the sub-menu.

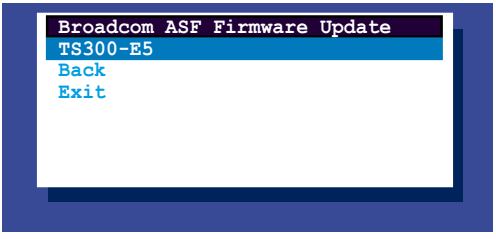
ICH7R INTEL RAID Driver



ICH7R LSI RAID Driver



Broadcom ASF Firmware Update



7. Locate the RAID driver and place a blank, high-density floppy disk to the folppy disk drive.
8. Press <Enter>.
9. Follow screen instructions to create the driver disk.

Boot from Windows® Server

To create a RAID driver disk in Windows® Server environment:

1. Restart the system from the hard disk drive, then place the system/ motherboard support CD in the optical drive.
2. Browse the contents of the support CD to locate the driver disk utility. The Windows 32-bit OS RAID driver disk for the Intel® Matrix Storage Manager is located in:

   \Drivers\ICH7R Intel RAID\Driver\win32\F6flpy32.exe

   The Windows 2003 64-bit OS RAID driver disk for the Intel® Matrix Storage Manager is located in:

   \Drivers\ICH7R Intel RAID\Driver\win64\F6flpy64.exe

   The Windows 32-bit and 64-bit OS RAID driver disk for the LSI Logic Embedded SATA RAID is located in:

   \Drivers\ICH7R LSI RAID\Driver\makedisk\win32_64.exe
3. Insert a formatted high-density floppy disk to the floppy disk drive.
4. Follow screen instructions to complete the process.
5. After creating a RAID driver disk, eject the floppy disk, then write-protect it to prevent computer virus infection.

Boot from Red Hat® Enterprise Linux/SUSE Linux Enterprise Server

To create a RAID driver disk in Red Hat® Enterprise Linux / SUSE Linux Enterprise server environment:

1. Insert a blank formatted high-density floppy disk to the floppy disk drive.
2. Decompress the file into the floppy disk from the following path in the support CD:

   LSI Logic Embedded SATA RAID Driver:

   \Drivers\ICH7R LSI RAID\Driver\Makedisk
3. Eject the floppy disk.

For systems with other Lunix versions that are not listed in the Makedisk menu, explore the support CD and copy the driver file from the following path: For LSI Logic Embedded SATA RAID Driver:\Drivers\ICH7R LSI RAID\ Driver\Linux\.

7.1.2 Creating a RAID driver disk (for PX4 Model)

You may have to use another system to create the RAID driver disk from the system/motherboard support CD or from the Internet.

A floppy disk with the RAID driver is required when installing Windows® Server or Red Hat® Enterprise / SuSE operating system on a hard disk drive that is included in a RAID set connected to the SASsaby 1064E SAS RAID controller card. Follow the next steps to create a RAID driver disk.

Windows® Server

To create a RAID driver disk in Windows® Server environment:

1. Place your blank diskette in the appropriate drive.
2. Insert the LSI support CD into your optical disc drive.

   The display screen should open automatically. If the display screen does not open, click **My Computer > CD Drive D:** and double-click the **Launch.exe** icon.
3. Click the **Windows Driver** button.

   The Disk Copy Utility opens.
4. Click the **Create** button in the Utility.

   A confirmation box appears.
5. Click the **Yes** button in the confirmation box

   The utility prepares your driver diskette. When the utility is finished, it displays a message.
6. In the message, click the **OK** button, then click the **Exit** button to close the LSI support CD.

Red Hat® Enterprise Linux/SUSE Linux Enterprise Server:

To create a RAID driver disk in Red Hat® Enterprise Linux / SUSE Linux Enterprise server environment:

1. Place your blank diskette in the appropriate drive.
2. Insert the LSI support CD into your CD-ROM drive.

   The display screen should open automatically. If the display screen does not open, open the CD manually in your graphic user interface.
3. Click the Linux Driver button.
4 Manually copy the driver image file to your PC's hard drive or a USB memory stick.

5. Do one of the following actions:
   - On a Windows PC – Type rawrite.exe to extract the driver image file to the blank diskette.
   - On a Linux PC – Type dd if=<imageFileName> of=<floppyDeviceName> bs=10k to extract the driver image file to the blank diskette.

     Where <imageFileName> is the driver image file name and <floppyDeviceName> is the device name, such as /dev/ fd0.

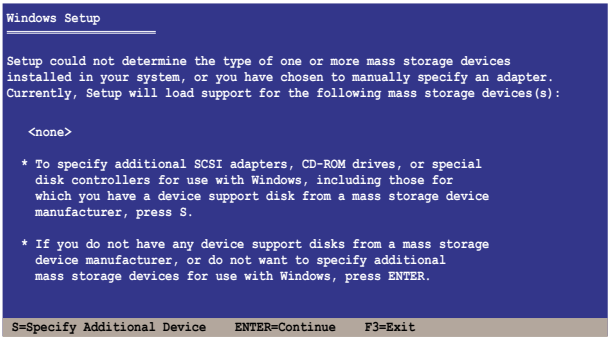
7.1.3 Installing the RAID controller driver (for PA4 Model)

Windows® Server

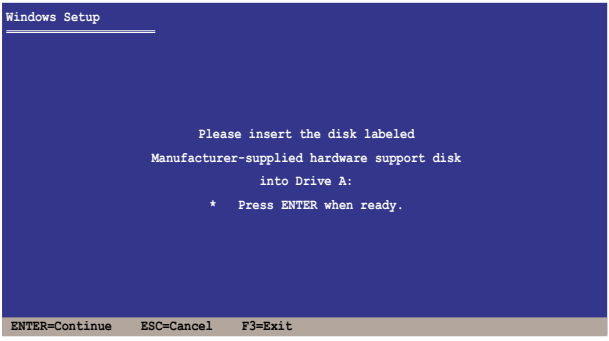
During Windows® Server installation

To install the RAID controller driver when installing Windows® Server:

1. Boot the computer using the Windows® Server installation CD.
2. Press <F6> when the message "**Press F6 if you need to install a third party SCSI or RAID driver...**" appears at the bottom of the screen.
3. When prompted, press **<S>** to specify an additional device.



4. Insert the RAID driver disk you created earlier to the floppy disk drive, then press <Enter>.

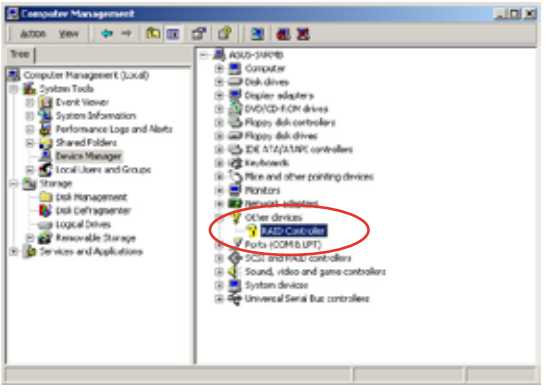


5. Select the RAID controller driver from the list, then press <Enter>.
6. The Windows® Setup loads the RAID controller drivers from the RAID driver disk. When prompted, press <Enter> to continue installation.
7. Setup then proceeds with the OS installation. Follow screen instructions to continue.

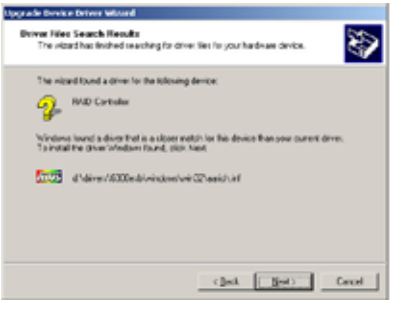
To an existing Windows® Server

To install the RAID controller driver on an existing Windows® Server:

1. Restart the computer, then log in with **Administrator** privileges.
2. Windows® automatically detects the RAID controller and displays a **New Hardware Found** window. Click **Cancel**.
3. Right-click the **My Computer** icon on the Windows® desktop , then select **Properties** from the menu.
4. Click the **Hardware** tab then click the **Device Manager** button to display the list of devices installed in the system.

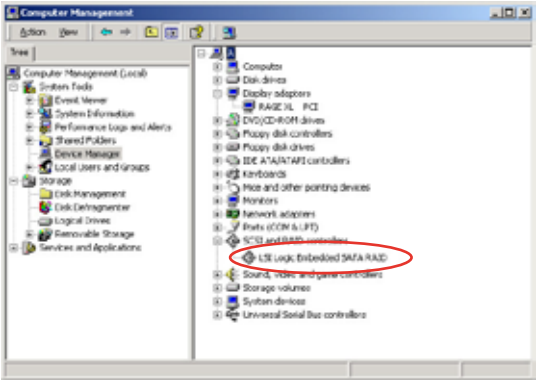


5. Right-click the **RAID controller** item, then select **Properties**.
6. Click the **Driver** tab, then click the **Update Driver** button.
7. The **Upgrade Device Driver Wizard** window appears. Click **Next**.
8. Insert the RAID driver disk you created earlier to the floppy disk drive.
9. Select the option **"Search for a suitable driver for my device (recommended)"**, then click Next.
10. The wizard searches the RAID controller drivers. When found, click **Next** to install the drivers.
11. Click **Finish** after the driver installation is done.



To verify the RAID controller driver installation:

1. Right-click the **My Computer** icon on the Windows® desktop , then select **Properties** from the menu.
2. Click the **Hardware** tab, then click the **Device Manager** button.
3. Click the "+" sign before the item **SCSI and RAID controllers**. The **LSI Logic Embedded SATA RAID** or **Intel® 8201 GR/GH SATA RAID** items should appear.

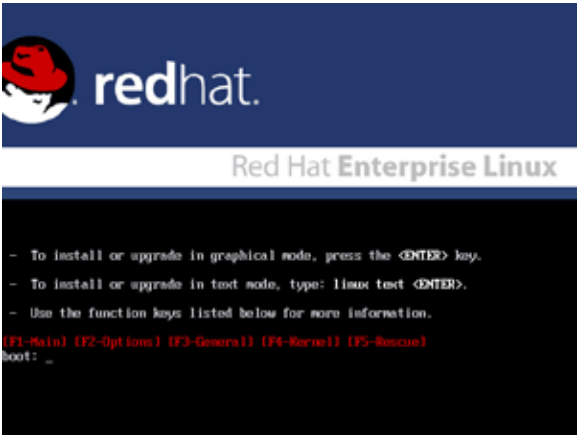


4. Right-click the **RAID controller driver** item, then select **Properties** from the menu.
5. Click the **Driver** tab, then click the **Driver Details** button to display the RAID controller drivers.
6. Click **OK** when finished.

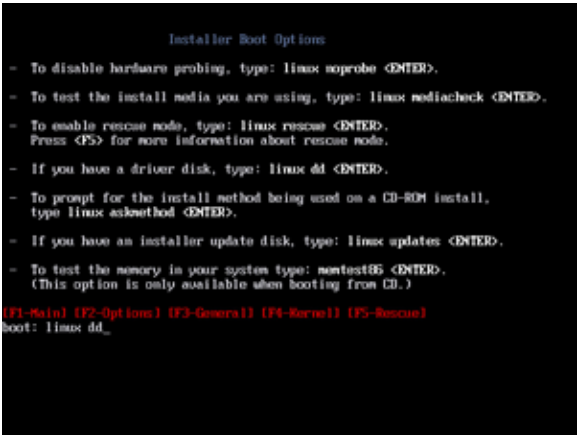
Red Hat® Enterprise

To install the Intel® ICH7R LSI Logic Embedded SATA RAID controller driver when installing Red Hat® Enterprise operating system:

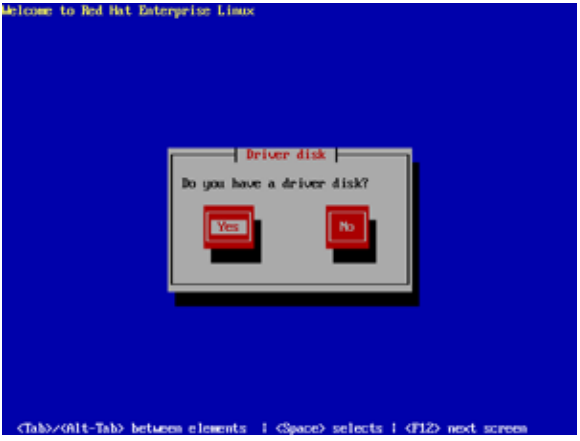
1. Boot the system from the Red Hat® Installation CD.



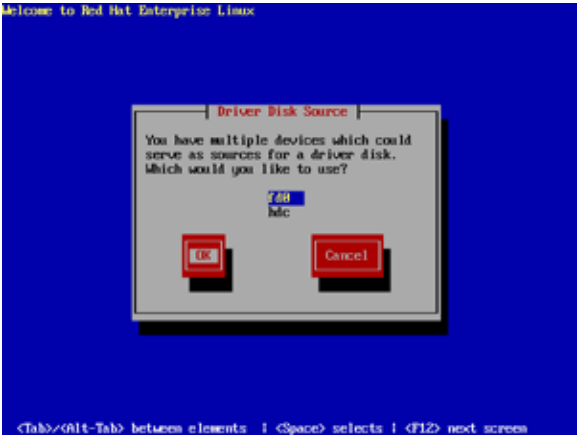
2. At the **boot:**, type **linux dd** , then press <Enter>.



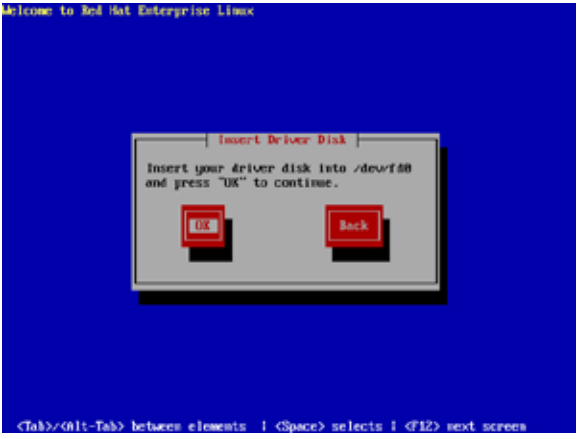
3. Select **Yes** using the <Tab> key when asked if you have the driver disk. Press <Enter>



4. Select **fd0** using the <Tab> key when asked to select the driver disk source. Press <Tab> to move the cursor to **OK**, then press <Enter>.

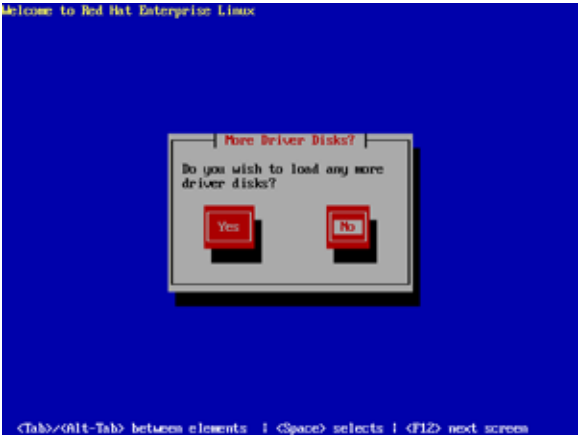


5. When prompted, insert the Red Hat® Enterprise ver. 3.0 RAID driver disk to the floppy disk drive, select **OK**, then press <Enter>.



The drivers for the RAID controller are installed to the system.

6. When asked if you will load additional RAID controller drivers, select **Yes**, then install the additional RAID controller drivers.

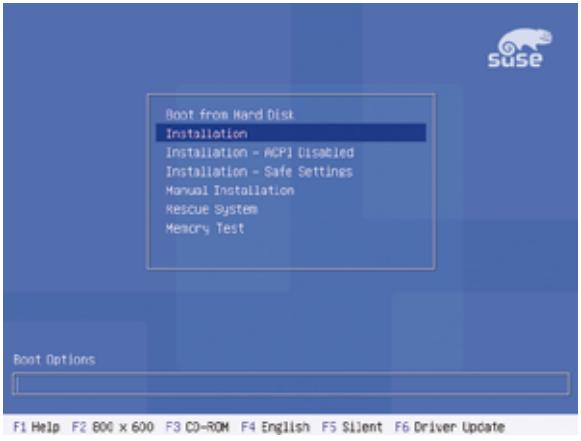


7. Follow screen instructions to continue the OS installation.

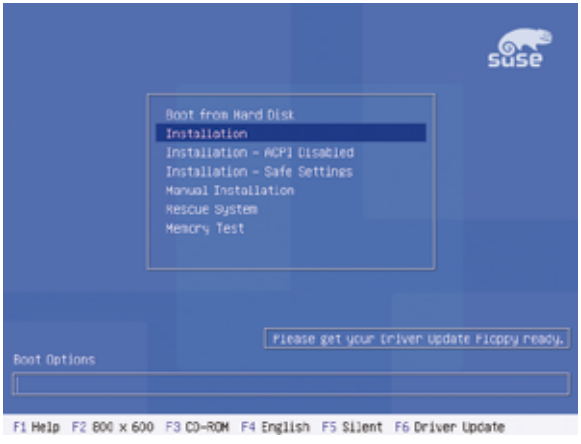
SuSE Linux

To install the RAID controller driver when installing SuSE Linux OS:

1. Boot the system from the SuSE Installation CD.
2. Select **Installation** from the **Boot Options** menu, then press <Enter>.



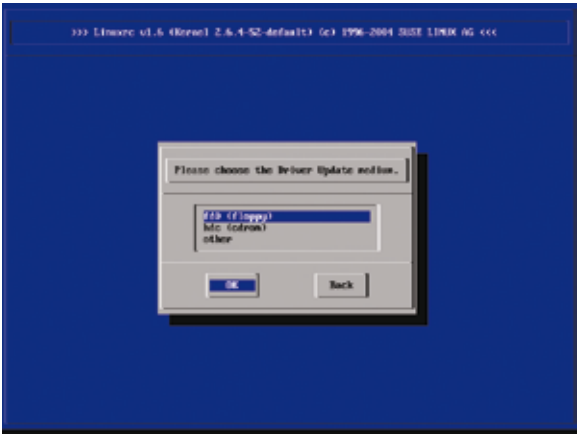
3. A message instructs you to prepare the RAID driver disk. Press <F6>.



For SuSE Linux Enterprise Server 9.0 SP1 operating system, do not use OS bundled driver, otherwise your computer may become unstable due to OS limitation.

4. When prompted, insert the RAID driver disk to the floppy disk drive, then press <Enter>.

5. When prompted, select the floppy disk drive (fd0) as the driver update medium, select **OK**, then press <Enter>.



The drivers for the RAID controller are installed to the system.

7.1.4 Installing the RAID controller driver (for PX4 Model)

Windows® Server

During Windows® Server installation

To install the RAID controller driver when installing Windows® Server:

1. Start the installation:
   - Floppy Install: Boot the computer with the Windows Server installation diskettes.
   - CD-ROM Install: Boot from the CD-ROM. Press **F6** after the message "**Press F6 if you need to install third party SCSI or RAID driver**" appears.
2. When the Windows Server Setup window is generated, press **S** to specify an Additional Device(s).
3. Insert the LSI driver diskette into drive A: and press **Enter**.
4. Choose **LSI 1064E (tm) Controller** from the list that appears on screen, and then press **Enter**.
5. Press **S** to use the driver on the floppy disk and then press **Enter** to continue with installation.
6. The Windows Server Setup screen will appear again saying "**Setup will load support for the following mass storage devices:**" The list will include "LSI 1064E (tm) Controller".

   NOTE: If there are any additional devices to be installed, specify them now. When all devices are specified, continue to the next step.
7. From the Windows Server Setup screen, press the Enter. Setup will now load all device files and then continue the Windows Server installation.

To an existing Windows® Server

To install the RAID controller driver on an existing Windows® Server:

After installing the LSI 1064E RAID Controller card and rebooting your system, Windows Server setup will show a "**Found New Hardware**" dialog box. Under Windows, "**RAID Controller**" will be displayed.

1. Insert the LSI driver diskette into the A:\ drive.
2. Choose **Install the software automatically** and press the Enter key.
3. Choose **LSI 1064E (tm) Controller** from the list that appears on screen, and then press the Enter key.
4. If using a driver that has not been digitally signed by Microsoft, you will be asked if you want to continue the installation. Click **Continue anyway**.
5. When the New Hardware Wizard has finished installing the LSI driver, click Finish.

Confirming Driver Installation

1. Right-click the **My Computer** icon and choose **Manage** from the popup menu.
2. From the left panel, choose **Device Manager**.
3. Click the "**+**" in front of **SCSI and RAID controllers**. "**LSI 1064E (tm) Controller**" and "**LSI Raid Console**" should appear.

Red Hat® Enterprise

During Red Hat® OS installation

To install the RAID controller driver when installing Red Hat® Linux OS:

1. Start the RedHat Linux Installation by booting from the install CD.

   At the "Welcome to Red Hat Linux..." installation screen, a prompt labeled **boot:** will appear at the bottom of the screen.
2. Type **linux dd acpi=off** and press Enter.
3. When the Installer asks, "**Do you have a driver disk?**" click **Yes**.
4. At the "**Insert your driver disk and press OK to continue**," insert the driver diskette into the floppy drive and click **OK**.
5. Continue with the installation normally.

On first installation mode, do not choose the **Virtualization** option. LSI does not support it.

To an existing Red Hat® OS

To install the RAID controller driver on an existing Red Hat® Linux OS:

1. Insert LSI driver diskette into the floppy drive.
2. Log in as root.
3. Type **mount -r /dev/fd0 /media/floppy**.
4. Type **cd /media/floppy**
5. Type **sh ./install**.
6. When the installer asks, "**You are installing a driver on an existing OS. Is it true (y/n)?**" type **Y** and press Enter.
7. Type **cd; umount /media/floppy**.
8. Remove the LSI driver diskette.
9. Type **reboot** to restart the system.

SuSE Linux

During SuSE Linux OS installation

To install the RAID controller driver when installing SuSE Linux OS:

1. Start the SuSE Linux Installation by booting from the install CD.
2. As the system boots, press F5 for the Driver Disk.
3. Move the cursor to the **Installation – ACPI Disabled** option, and press Enter.
4. When the installer displays, "**Please insert the Driver Update floppy/ CDROM**," insert the LSI driver disk, then press Enter.
5. When the **Driver Update Menu** pops up, click **OK**, then click **Back** to return to the installer.
6. Follow the on-screen prompts to complete the installation.

To an existing SuSE Linux OS

To install the RAID controller driver on an existing SuSE Linux OS:

1. Insert the LSI driver diskette into the floppy drive.
2. Log in as **root**.
3. Type **mount /dev/fd0 /media/floppy**.
4. Type **cd /media/floppy**
5. Type **./install**.
6. Type **cd; umount /media/floppy**.
7. Remove the LSI driver diskette.
8. Type **reboot** to restart the system.

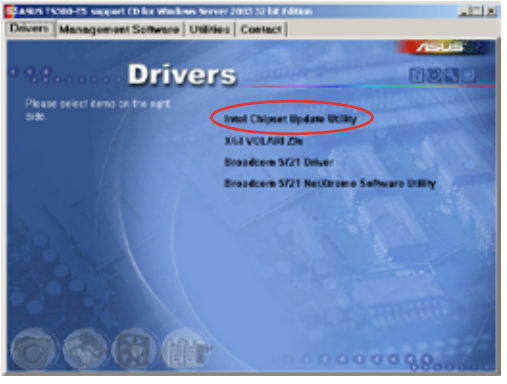
7.2 Intel® chipset software installation

This section provides instructions on how to install the Plug and Play components for the Intel® chipset on the system.

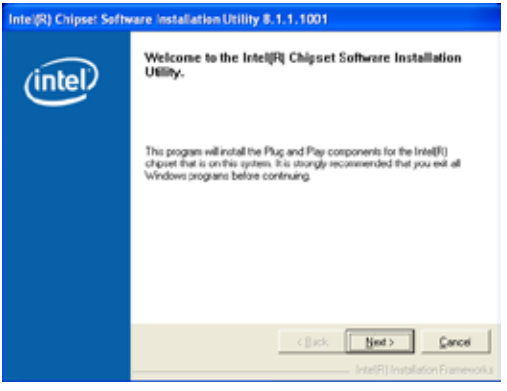
You need to manually install the Intel® chipset software on a Windows Server operating system.

To install the Intel® chipset software

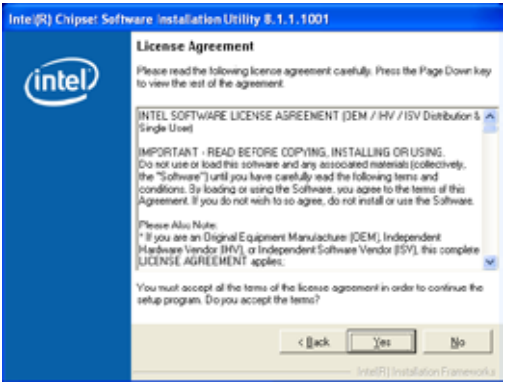
1. Restart the computer, then log on with **Administrator** privileges.
2. Insert the motherboard/system support CD to the optical drive. The support CD automatically displays the **Drivers** menu if Autorun is enabled in your computer.
3. Click the item **Intel(R) Chipset Software Installation Utility** from the menu.



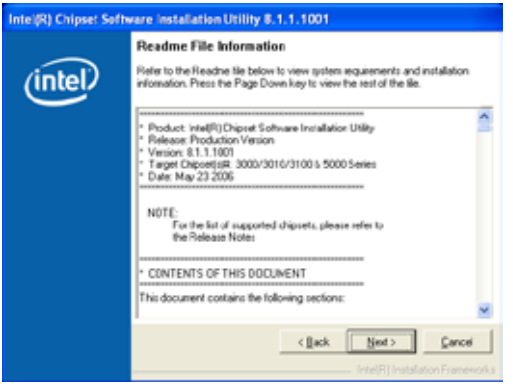
4. The **Intel(R) Chipset Software Installation Utility** window appears. Follow the screen instructions to complete installation.



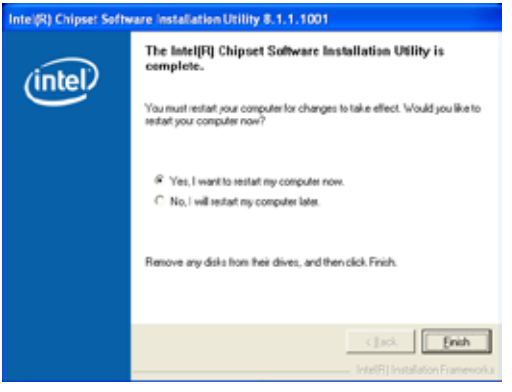
5. Select **Yes** to accept the terms of the **License Agreement** and continue the process.



6. Read the **Readme File Information** and press **Next** to activate the installation.



7. After completing the installation, click **Finish** to restart the computer.



7.3 VGA driver installation

This section provides instructions on how to install the XGI Graphics driver.

7.3.1 Windows® Server

You need to manually install the XGI Graphics driver on a Windows® Server operating system.

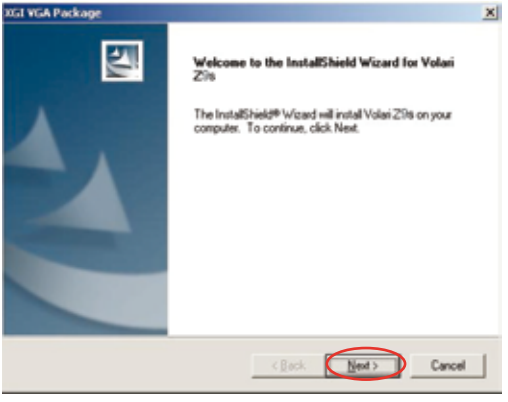
To install the XGI Graphics driver

1. Restart the computer, then log on with **Administrator** privileges.
2. Insert the motherboard/system support CD to the optical drive. The support CD automatically displays the **Drivers** menu if Autorun is enabled in your computer.

Windows® automatically detects the VGA controller and displays a **New Hardware Found** window. Click **Cancel** to close this window.

3. Click the item **XGI VOLARI Z9s** from the Drivers menu.

4. The **XGI VOLARI Z9s** window appears. Click **Next**. Follow screen instructions to complete installation.



7.3.2 Red Hat® Enterprise

The Red Hat® Enterprise operating system automatically recognizes the XGI Graphics driver during system installation. There is no need to install an additional driver(s) to support the onboard VGA.

7.4 LAN driver installation

This section provides instructions on how to install the Broadcom BCM5721 LAN controller driver.

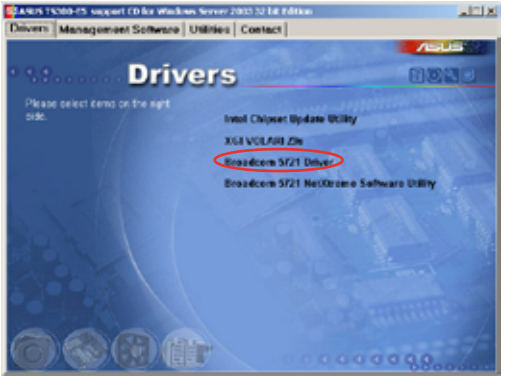
7.4.1 Windows® Server

To install the Broadcom BCM5721 LAN controller driver on a Windows® Server:

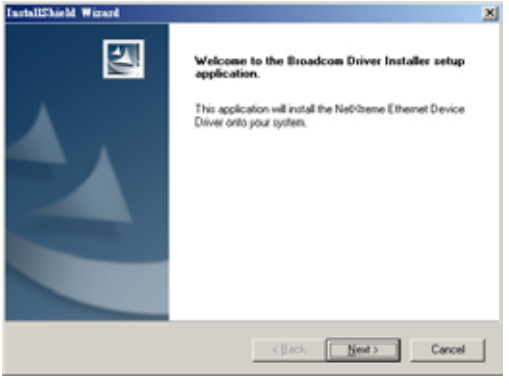
1. Restart the computer, then log on with **Administrator** privileges.
2. Insert the motherboard/system support CD to the optical drive. The CD automatically displays the **Drivers** menu if Autorun is enabled in your computer.

- Windows® automatically detects the LAN controllers and displays a **New Hardware Found** window. Click **Cancel** to close this window.
- If Autorun is NOT enabled in your computer, browse the contents of the support CD to locate the file ASSETUP.EXE from the BIN folder. Double-click the **ASSETUP.EXE** to run the CD.

3. Click the **Broadcom 5721 Driver** option to begin installation.



4. Click **Next** when the InstallShield Wizard window appears. Follow screen instructions to continue installation.



7.4.2 Red Hat® Enterprise

Follow these instructions when installing the Broadcom 5721 LAN controller base driver for the Red Hat® Enterprise operating system.

Building the driver

Install first the Kernel Development tools before building the driver from the TAR file.

To build the driver:

1. Copy the Lan Driver from the SCD and save it in TMP.
2. Decompress the file.
3. Enter **DriverInstall**.
4 Enter **./install.sh**.
5. Enter **# cd/usr/src/linux**

   # cat/patch-location/sk98lin_vX.XX_a_b_c_patch I patch -p1.
6. Enter **make menuconfig**, select **Broadcom 1000 Lan** from the prompt menu, and then select **M** from the submenu.
7. Enter **make clean**.
8. Enter **make modules**.
9. Enter **make modules SUBDIRS=drivers/net/sk98lin/ V=1**.
10 Enter **make modules_install SUBDIRS=drivers/net/sk98lin/ V=1.**
11 Enter **rm /lib/modules/2.6.16.21-0.8-bigsmp/kernel/drivers/net/ssk98lin/sk98lin.ko**.
12. Enter **depmod**.
13. Enter **modprobe sk98lin**.

7.5 Management applications and utilities installation

The support CD that came with the motherboard package contains the drivers, management applications, and utilities that you can install to avail all motherboard features.

The contents of the support CD are subject to change at any time without notice. Visit the ASUS website (www.asus.com) for updates.

7.5.1 Running the support CD

Place the support CD to the optical drive. The CD automatically displays the Drivers menu if Autorun is enabled in your computer.

If Autorun is NOT enabled in your computer, browse the contents of the support CD to locate the file ASSETUP.EXE from the BIN folder. Double-click the **ASSETUP.EXE** to run the CD.

7.5.2 Drivers menu

The Drivers menu shows the available device drivers if the system detects installed devices. Install the necessary drivers to activate the devices.

The screen display and driver options vary under different operating system versions.

7.5.3 Management Software menu

The **Management Software** menu displays the available network and server monitoring application. Click on an item to install.

7.5.4 Utilities menu

The **Utilities** menu displays the software applications and utilities that the motherboard supports. Click on an item to install.

7.5.5 Contact information

Click the **Contact** tab to display the ASUS contact information. You can also find this information on the inside front cover of this user guide.

Appendix

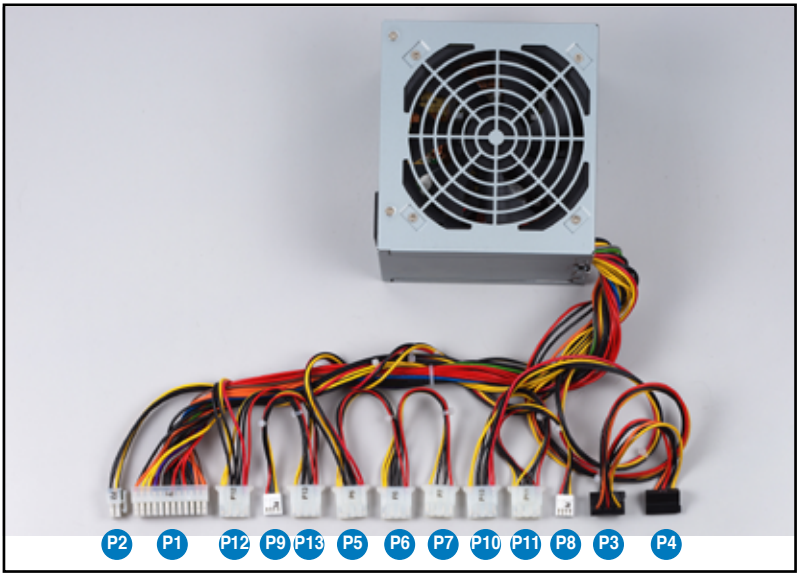
This section provides information about the power supply unit and a troubleshooting guide for solving common problems when using the barebone server.

Reference information

A.1 450 W single power supply

A.1.1 General description

The 450 W SSI-type single power supply with universal AC input includes PFC and ATX-compliant output cables and connectors. The power supply has 13 plugs labeled P1 to P13. Take note of the devices to which you should connect the plugs.



P2	Motherboard 4-pin +12V power connector
P1	Motherboard 24-pin ATX power connector
P12	Peripheral device (available); connect this to the SAS / SATA backplane
P9	Floppy disk drive
P13	Peripheral device (available)
P5	Peripheral device (available)
P6	Peripheral device (available)
P7	Peripheral device (available); connect this to the SAS / SATA backplane
P10	Peripheral device (available); optical drive
P11	Peripheral device (available)
P8	Peripheral device (available)
P3	Serial ATA device
P4	Serial ATA device

A.1.2 Specifications

Input Characteristics

Input Voltage Range

Normal Range	110 to 127 V ~ 10 A
Auto Range	200 to 240 V ~ 5 A

Input Frequency Range 50 Hz to 60 Hz

DC Output characteristics

Output Voltage	Max (A)
+3.33V	24
+5V	24
+12V	43
-12V	0.5
-5V	0.5
+5VSB	2.0

A.2 Simple fixes

Some problems that you may encounter are not due to defects on the system or the components. These problems only requires simple troubleshooting actions that you can perform by yourself.

Problem	Action
The power LED on the server or on the monitor do not light up	1. Check if the power cable is properly connected to the power connector in the system rear panel. 2. Make sure that the power cables are connected to a grounded power outlet. 3. Press the power button to make sure that the system is turned on.
The keyboard does not work	Check if the keyboard cable is properly connected to the PS/2 keyboard port.
The mouse does not work	Check if the mouse cable is properly connected to the mouse port.
The system does not perform power-on self tests (POST) after it was turned on	1. Check the memory modules and make sure you installed the DIMMs the system supports. 2. Make sure that the DIMMs are properly installed on the sockets.
The system continuously beeps after it was turned on.	1. Check the memory modules and make sure you installed supported DIMMs. 2. Make sure that the DIMMs are properly installed on the sockets.
The message "Non-system disk or disk error" appears	1. Check if a bootable HDD is active. 2. Check if the HDDs are properly installed.
Network connection not available	1. Make sure that the network cable is connected to the LAN port on the rear panel. 2. Make sure that you have installed the LAN drivers from the support CD.